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OF

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JOURNAL
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No. 1.

MAY. 1817.

VOL. I.

THE members of the Academy of Natural Sciences of Philadelphia, desirous of acquiring knowledge themselves, and extending it among their fellow citizens, have for some years been accustomed to meet at leisure hours for the purpose of communicating to each other such facts and observations, as are calculated to promote the views of the society. By degrees, a collection of subjects in natural history was made, and has increased until a museum has been formed, which is already very valuable, and which is daily increasing.

In further pursuance of the objects of their institution, the Society have now determined to communicate to the public, such facts and observations as, having appeared interesting to them, are likely to be interesting to other friends of natural science. They do not profess to make any periodical communication; but well knowing how desirable it is, that persons engaged in similar pursuits, should be made acquainted as early as possible with what has been done by their fellow-labourers in the fields of science elsewhere, they mean to publish a few pages whenever it appears to them that materials worthy of pub-

INTRODUCTION.

lication have been put in their possession. In so doing, they propose to exclude entirely all papers of mere theory,—to confine their communications as much as possible to facts—and by abridging papers too long for publication in their original state, to present the facts thus published, clothed in as few words as are consistent with perspicuous description.

Well aware that much leisure and superfluous wealth are not always found in company with an ardent love of science, they mean their proposed publication to be as cheap and as unostentatious as the nature of the subjects will admit; so that it need not encroach unnecessarily on the funds of the society, or of those who may wish to purchase it. In short, they are desirous of contributing their share to the mass of knowledge, as early in all cases, and with as little show, and as small expense as possible. The present publication will be a specimen of what they propose in future.

They invite the lovers of science generally, and particularly all those who are anxious for its encouragement in the United States, to aid in promoting the objects of this institution, and to encourage the present publication, so long as the contents of it shall prove deserving of public approbation.

All papers intended for publication in this Journal, must be post paid, and directed, under the *proper signatures* of the authors, to the Academy of Natural Sciences, No. 35 Arch-street, Philadelphia.

Description of six new species of the genus FIROLA, observed by Messrs. Le Sueur and Peron in the Mediterranean Sea, in the months of March and April, 1809
By C. A. Le Sueur. With a Plate.

MOLLUSCA PTEROPODEA†.

Character. Body free; furnished with fins for swimming; head distinct.

A. PTEROPODES NAKED.

Character. Destitute of a gelatinous, horny, or calcareous shell.

* No TENTACULA.

Genus.—FIROLA.

Char. Jaws horny; eyes two; fins 1, 2, 3; branchia plumose, floating freely beneath the body, and grouped with the heart, around an oblong nucleus at the base of the tail.

The body is elongated, cylindrical, of a gelatinous, diaphanous consistence, and of a pale colour. Tail distinguished from it by a groove, one fourth the length of the body, compressed, more or less carinated, and laterally serrated, terminated by a lobed fin, and sometimes with a moniliform, elongated appendage. Eyes composed of a brilliant hyaline globule, supported by a small peduncle, which arises from a black concave or convex cup, placed at the junction of the rostrum with the body. Several small gelatinous points, before and above the eyes, serving probably to assist in retaining the molluscous prey in

† Vid. Annal. du Muséum d'Hist. Nat. T. 14 and 15.

order that it may be the more easily devoured, when pressed between them and the jaws.

Rostrum one fourth the length of the body, somewhat contractile, moveable in every direction, enlarged at the tip to receive the retractile jaws; which are opposite, and armed with a series of horny curved points ranged upon each jaw like the teeth of a comb, with a row of smaller ones between them, and furnished at the base with a longitudinal lip. Immediately behind the jaws, on the interior, are two capitate threads connected by nerves; adjoining these are two palpiform biarticulate processes; first joint very short, oblique; second elongated, recurved; probably used by the animal as interior palpi.

Nervous System. A nervous ganglion of four rounded lobes is situated between the eyes and the œsophagus, giving rise to several nervous filaments; the four principal ones, arise each from the extremity of a lobe; two of them terminate in the jaw, and the other two are directed backwards to the tail, but interrupted at the base of the dorsal fin by a double, oblong, lobated, ganglion.

The centre of the first ganglion furnishes two nerves for each eye, of which one terminates at the base of the peduncle, and the other, much smaller, at the pupil. Numerous smaller nerves arise from each of these nervous ganglions, directed to different parts of the body.

Viscera. Nucleus oblong, pyriform. Colour iridescent, when at the depth of three, four, or five feet in the water, it is resplendent, diamond-like. A large cylindrical canal, more or less dilated, attached to the throat at the anterior extremity, supported near and above the eyes by a membranous diaphragm, passing loosely through a large cavity of the body, and embracing at its termination

the upper part of the nucleus, with which it communicates by means of two apertures, one of which is simple and the other double.

Besides the above mentioned apertures in the nucleus, another oblong one is placed on the right side for the passage of the oviduct; and another on the opposite side, probably serving for excretion. Oviduct filiform, including small remote globules.

Vascular System. Composed of a heart, branchia, and artery. The heart is placed between, and in contact, with the branchia and artery. Branchia with from twelve to sixteen perfoliated appendages. Artery extended from the heart to its termination near the jaw, where it is surrounded by four tubercles; in its course it passes through the interstice of the double ganglion. A branch arises from this principal artery, immediately before the last mentioned ganglion, furnishing the dorsal fin with blood by means of numerous smaller anastomosing branches, exhibiting, in that fin, a reticulated appearance.

OBS. In some species of this genus a lateral vermiform organ is superadded; when this occurs, a second branch arises from the principal artery to supply it with blood.

Generative Organs. A vermiform organ is attached to the left side of the body composed of three parts; of which, one is placed above, and seems intended to protect the others; the second is short, cylindrical, straight; the third, elongated, vermicular, attached to the base of the second. This is probably the generative part of the male. The species furnished with an oviduct may be females, as this part is placed on the side opposite to that of the vermiform organ, so as to facilitate the connection between the sexes.

Organs of Locomotion. Fins two; dorsal one large, rounded, moved by twenty pair of compressed muscles, each terminating in a bifurcated point, and united in that part of the opposite muscle, confluent at base, and furnished with two radicles, which penetrate the body between the peritoneum and the exterior gelatinous substance. Caudal fin very small, lobated or rounded, including small rameose vessels, and moved by three pairs of muscles, at their extremities filiform and united in a common point. I have not been able to perceive any distinct muscles in other parts of the body, excepting those already mentioned, and numerous oblique ones between the peritoneum and the gelatinous exterior.

Amongst a great number of individuals which I have examined, the number and situation of the organs or appendages, the presence or absence of either of them, have furnished me with good specific characters. Of these I have availed myself to establish the following six species.

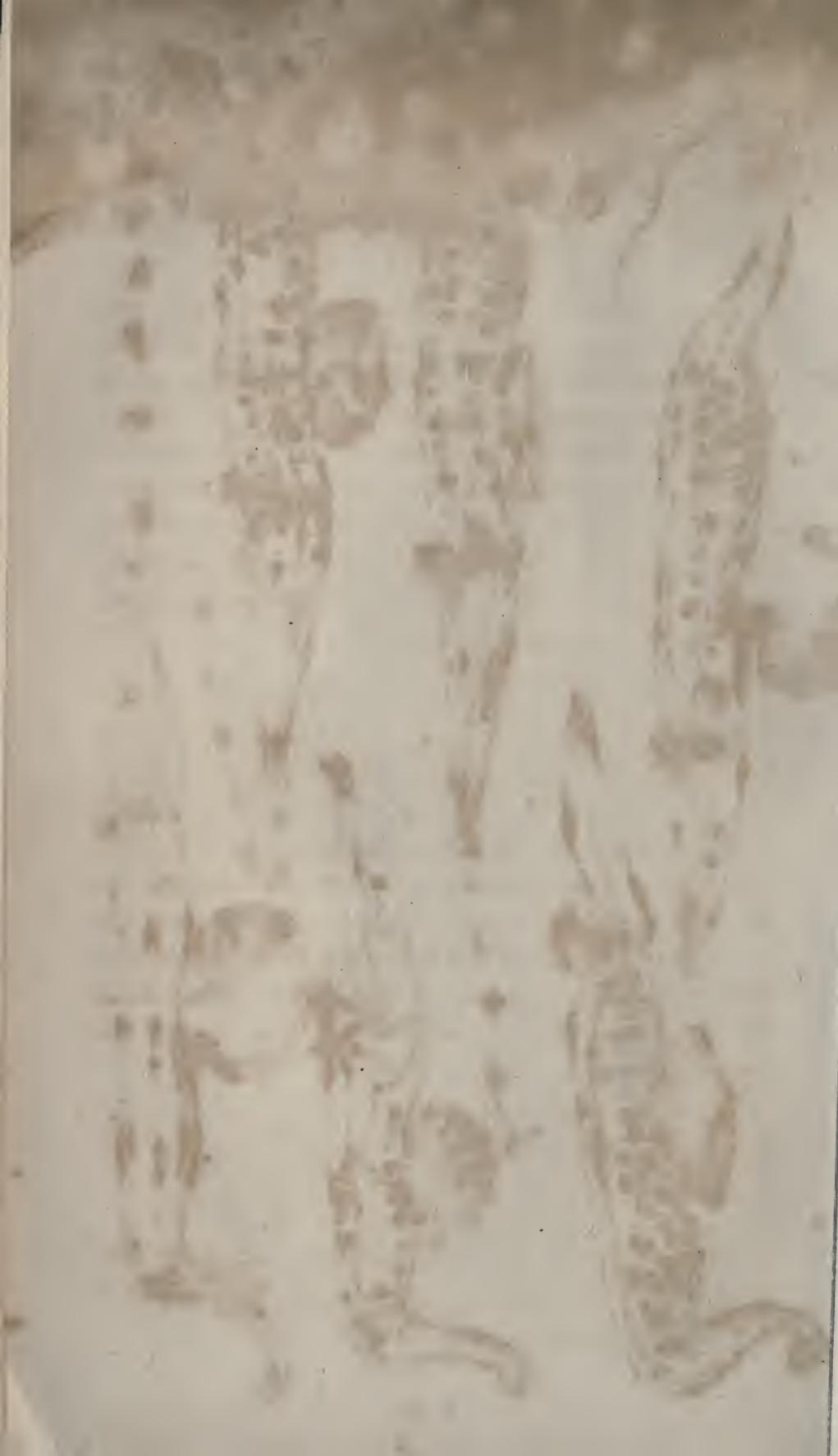
1. *F. mutica.* No vermiform organ; no cup on the dorsal fin; no caudal appendage. Plate I. fig. 1.

Substance firm, diaphanous, tuberculated, rosaceous; tubercles irregularly placed, and of a deeper colour. Dorsal fin nearer the nucleus, placed in a groove. Trunk wrinkled, and with the region of the dorsal fin spotted with white. Gelatinous points six, disposed by opposite pairs in two longitudinal lines.

2. *F. gibbosa.* Body furnished with a vermiform organ; no cup or caudal appendage. Plate I. fig. 2.

Body gibbose above the nucleus, narrowed behind the eyes, and emarginate at the base of the dorsal fin.





Gelatinous points disposed in a single semicircular row. Colour pale blue, with two lateral fillets of rosaceous tubercles; base of the dorsal fin yellow.

3. *F. Forskalia*. Body with a vermiform organ; and a cup on the dorsal fin. No caudal appendage. Plate I. fig. 3. represented in the act of devouring a species of the genus *Cymodora* of Peron and Le Sueur.

Body cylindrical, subequal, with a dorsal groove. Colour pale violaceous, a lateral row of rosaceous tubercles, double before. Cup resembling a small basket, with four radical threads passing between the muscles of the fin; fin somewhat elongated behind. Gelatinous points, disposed as in the first species.

4. *F. Cuviera*. Body destitute of the vermiform organ and cup. Tail with an appendage. (*F. Cuviera*. Peron and Le Sueur; Annales du Museum d'Histoire Nat. t. 14. p. 218, and t. 15. p. 57. Pl. 2. fig. 8.) Plate I. fig. 4.

Body subequal, larger and transversely wrinkled before; with a dorsal groove. Colour pale violaceous; tubercles rosaceous, irregularly disposed; one on each side of the dorsal fin larger and transverse, with two longitudinal ones placed upon the tail. Gelatinous points eight; four in a transverse line, surmounted by four others in two transverse lines.

5. *F. Frederica*. A cup on the dorsal fin, and caudal appendage. Vermiform organ none. Plate I. fig. 5.

Body very much resembling that of *F. Cuviera*.

6. *F. Peronia*. A vermiform organ, cup on the dorsal fin, and caudal appendage. Gelatinous points none. Plate I. fig. 6.

Body cylindrical, diaphanous, spotted with white at the base of the dorsal fin; tubercles none.



Account of a North American Quadruped, supposed to belong to the Genus Ovis, by George Ord.

ROCKY-MOUNTAIN SHEEP.
OVIS MONTANA.

IN the Journal of Lewis and Clark, there is an account of a quadruped which appears to have not excited that attention which it merits. The following extracts are made from the above mentioned work: "Saw the skin of a mountain sheep, which the Indians say lives among the rocks in the mountains: the skin was covered with white hair, the wool long, thick and coarse, with long coarse hair on the top of the neck and the back, resembling somewhat the bristles of a goat." Vol. II. p. 49.

"The sheep is found in many places, but mostly in the timbered parts of the rocky mountains. They live in greater numbers on the chain of mountains forming the commencement of the woody country on the coast, and passing the Columbia between the falls and rapids." Vol. II. p. 169.

The latter passage was written while our travellers wintered at the mouth of the Columbia river. But on their return, at Brant Island, an Indian "offered two sheep skins for sale: one, which was the skin of a full-grown sheep, was as large as that of a common deer; the second was smaller, and the head part, with the horns remaining, was made into a cap, and highly prized as an ornament by the owner. The Clahelolahs informed us

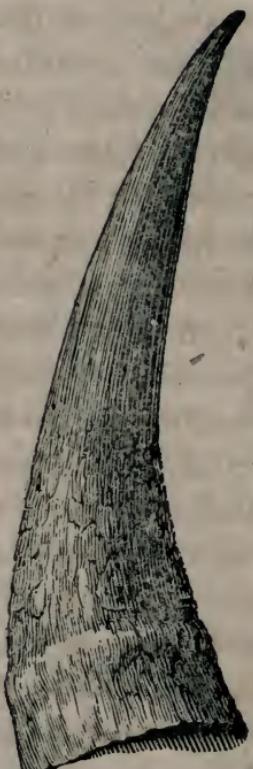
that the sheep are very abundant on the heights, and among the cliffs, of the adjacent mountains; and that these two had been lately killed out of a herd of thirty-six, at no great distance from the village." Vol. ii. p. 233.

"The Indians assert, that there are great numbers of the white buffalo or mountain sheep, on the snowy heights of the mountains, west of Clark's river. They generally inhabit the rocky and most inaccessible parts of the mountain, but as they are not fleet, are easily killed by the hunters." Vol. ii. p. 331.

In the above passages we are made acquainted with the important fact, that, besides the Argali or Big-horned sheep, we have another species in North America of the genus *Ovis*. The smaller of the two skins, which the Indian offered to sale at Brant Island, was purchased by captain Lewis, and was presented by him to the museum of Philadelphia. It is undoubtedly the skin of a young animal: it measures three feet from the insertion of the tail to the neck, its breadth is twenty-six inches; the tail is short, but it was probably not skinned to the end; along the back there runs a ridge of coarse hair, about three inches in length, and bristled up in the manner of that of the common goat, this ridge is continued up the neck, forming a kind of mane, and is thicker, coarser, and longer there than that of the back; the whole of the skin is closely covered with short wool, of an extreme fineness, surpassing in this quality that of any breed with which I am acquainted, not excepting the wool of the Merino lamb—a coat of hair conceals this wool, but on dividing the former with the hands, the latter lies so thick that the hairs are scarcely visible; the ears are narrow, and taper to a point, they are nearly four inches long; the

whole is white; the horns appear to have stood on the top of the head, somewhat in the manner of those of a goat, or of those on the figure of Shaw's Pigmy Antelope, Gen. Zool. vol. ii. plate 188, and vignette on the title-page. But one* horn is now attached to the skin, and that measures three inches and three quarters in length, on the fore part; it is slightly recurved, cylindrical and acuminated, its base is somewhat tumid, and, with its lower half, is scabrous, its upper part smooth, obsoletely striated, and of a black colour.

A cut of this horn, of the size of nature, accompanies this account, by which figure it will be evident to the naturalist, that the above described sheep is a distinct species. It is true that the animal was young, and we have no positive evidence that when full-grown or old the horns do not increase in size, so as to resemble those of some well-known species or varieties of the genus. One of Lewis and Clark's men informed them that he had seen the animal in the Black Hills, and that the horns were *lunated* like those of the domestic sheep. The Indians asserted that the horns were *erect* and *pointed*. The latter account is the more probable, as it has been remarked by travellers, that, in describing those natural productions with which they are conversant, our Indians seldom deviate from the truth.



* The other horn is in Peale's Museum.

We would incite the attention of our citizens to this important discovery; for although the Spanish missionaries, in 1697, made mention of this sheep, and it is again noticed in Venegas' History of California*, yet these accounts were discredited. It is to captain Lewis to whom belongs the honour of having been the first to assure his countrymen, by the exhibition of a genuine specimen, that the animal does exist. How subservient to the wants and pleasures of mankind it may be rendered by domestication, we cannot at present declare; but there is room for conjecture, that the introduction of this new species of a race of quadrupeds immemorially ranked among the most valuable of the gifts of the Creator, will confer a lasting benefit upon the agricultural and manufacturing interests of the community.

Since writing the foregoing, I have seen the three first volumes of the *Nouveau Dictionnaire d'Histoire Naturelle*, which work is now publishing in Paris; and in the article *Antelope* I find a description of an American quadruped, which is in the collection of the Linnean society of London. This description appears to have been extracted from a *memoire*, read before the Philomatique Society of Paris, by M. de Blainville, wherein the author proposes a new arrangement of the ruminants with hollow and persistent horns, and a subdivision of the *Genus Antelope*; and classes the above animal under the name of *Rupicapra Americana*. (*Bulletin de la Societe' Philomatique*, 1816, p. 80.) As I have not the satisfaction of seeing the *Bulletin*, I must be content with the information conveyed in the article in the *Nouveau Dictionnaire*. The specimen is said to be of the bigness of a middling sized goat; the

* Vol. i. p. 36. English translation, London, 1759.

body is entirely covered with long *pendent* hair, silky and totally white, but not curled; the head is elongated, without a muzzle or naked part, the ears of a middling size; the forehead not protuberant; the horns are short, tolerably thick, black, slightly annulated, they are round, almost straight, bent backwards, and terminated in a blunt point (*pointe mousse*); the legs are short, stout, and supported on short and thick hoofs; the tail is hardly perceptible, perhaps on account of the length of the hair. M. de Blainville inclined to the opinion that this animal is the same as the Pudu of Molina, Shaw's Gen. Zool. vol. ii. p. 392.

It is probable that the specimen belonging to the Linnean Society is of the same species as that brought by captain Lewis; and it is further probable that M. de Blainville was not permitted to examine his subject as closely as was requisite, otherwise the important circumstance of the thick coat of wool, beneath the outer covering of straight hair, would not have escaped his attention. As to the horns being obtuse, this may have arisen from an accident, or some other cause.

It is much to be wished that some traveller would bring a living specimen of this singular quadruped, or at least a dead specimen in such a state as should enable the naturalist to determine, with precision, its characters. From the information derived from captain Lewis, and from the descriptions above, we cannot, with propriety, arrange this animal with the Antelopes; and if it should not prove to be a true *Ovis*, it will, probably, constitute a new genus, and take its station, in the systems, between the sheep and the goat.

Description of Seven Species of American Fresh Water and Land Shells, not noticed in the systems. By Thomas Say.

Genus CYCLOSTOMA.

A subdiscoidal or conic univalve. The aperture orbicular, with a circularly continued margin, often suddenly and widely reflected.

SPECIES.

C. tricarinata. Shell with three volutions; three revolving, carinate, prominent lines, giving to the whorls a quadrate, instead of a cylindric appearance. Suture canaliculate, in consequence of the whorls revolving below the second carina and leaving an interval. Spire convex, apex obtuse. Umbilicus large. Carina placed, one on the upper edge of the whorl, one on the lower edge, and the third on the base beneath. Breadth one-fifth of an inch.

Inhabits the river Delaware. Rare.

Found by Mr. Le Sueur, whose proposed name is here adopted.

C. lapidaria. Shell turreted, subumbilicate, with six volutions, which are obsoletely wrinkled across. Suture impressed. Aperture longitudinally ovate-orbicular, operculated, rather more than one-third of the length of the shell.

Length about one-fifth of an inch.

Collection of the Academy of Natural Sciences.

Inhabitant not so long as the shell, pale; head elongated into a rostrum as long as the tentacula, and emarginate at tip; tentacula two, filiform, acuminated at tip, short; eyes prominent, situated at the external or poste-

rior base of the tentacula; base or foot of the animal dilated, oval, obtuse before and behind.

Found under stones, &c. in moist situations, on the margins of rivers. Like those of the genera *Lymnaea* and *Planorbis* this animal possesses the faculty of crawling on the surface of the water, in a reversed position, the shell downward.

Genus LYMNÆA.

Shells subovate, oblong or somewhat tapering. Aperture entire, longitudinally oblong, the right lip circularly joined to the left at the base and folded back on the pillar.

SPECIES.

L. columella. Shell thin, fragile, horn-colour; whorls four, longitudinally wrinkled. Spire prominent, acute. Suture not much impressed. Aperture dilated, ovate. Columella much narrowed near the base, so that the view may be extended from the base almost to the interior apex of the shell. Length seven-tenths of an inch nearly; of the spire one-quarter of an inch.

Inhabits stagnant waters and miry places.

Collection of the Academy.

Animal aquatic, base not so long as the aperture; dusky, with small whitish spots; *tentacula* broad, pyramidal, compressed; *eyes* small, black, placed at the inner base of the tentacula.

This species is allied to *L. Catascopium* of the American edition of Nicholson's Encyclopedia, but the revolution of the whorls is more oblique, the shell thinner, the aperture much more dilated, and the columella differently

formed. For several specimens of this shell I am indebted to Mr. Titian Peale.

Genus SUCCINEA. Drap.

Shell oval or oblong; aperture large, oblique; columella narrowed.

SPECIES.

S. ovalis. Shell suboval, pale yellowish, diaphanous, very thin and fragile, with nearly three oblique volutions. Body very large. Spire small, but little prominent, somewhat obtuse. Aperture longitudinally subovate, large. Columella much narrowed so as almost to permit the view of the interior apex, from the base of the shell. Scarcely any calcareous deposit on the pillar lip. Length nine-twentieths of an inch, aperture seven-twentieths.

Inhabits marshy grounds in shaded situations. Common.

Collection of the Academy.

Animal longer than its shell, furnished with four tentacula, the two superior ones longer, cylindrical, supporting the eyes; inferior ones, short, conic. Colour pale with minute black points, which are assembled into fascia on the sides and fillets on the neck above; neck granulate above, a black line passes each side on the neck, from the tip of the oculiferous tentacula, gradually disappearing under the shell. Front truncate, quadrate.

When the animal is living, so vitreous is the shell, that all the markings of its body are plainly discernable. So that although the shell is of a straw-colour, immaculate, it appears of a dusky hue, with a remarkable white, flexuous, longitudinal vitta on the back, arising from the su-

ture and terminated about mid way to the base, often with two or three obsolete white spots near its tip.

The characters of the inhabitant are widely distinct from the animal of the *Lymnæa*, and are somewhat allied to those of the inhabitants of the *Helices*; it cannot however be referred to *Helix* with propriety, as will be evident from the specific description. I have for the present considered it as of Draparnaud's genus *Succinea*, though it somewhat resembles a *Bulimus*, particularly in its habitat, being a terrestrial species, and in this respect it differs from *Succinea*. It may perhaps belong to Lamarck's genus *Amphibulimus*.

(To be continued.) *To p. 123*

It is hardly necessary to invite naturalists to make use of this Journal for the securing of their discoveries, as it must be obvious that a sheet, printed at short intervals, with the design of being disseminated amongst the learned at home and abroad, is a far more eligible record than a bulky volume, of limited circulation, to the completing and publishing of which, years are commonly devoted. "By withholding individual information," says Montagu, "general knowledge is suspended. Science is materially advanced by the promulgation of the sentiments of individuals, and poor indeed must be the resources of those from whom nothing is to be learned."

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*Description of Seven Species of American Fresh Water
and Land Shells, not noticed in the systems. By Thomas Say.*

(Concluded.)

Genus HELIX.

Shell subglobose, suborbicular, broader than long; spire convex; aperture wider than long, diminished above by the convexity of the penultimate whorl.

SPECIES.

H. Hirsuta. Shell subglobose, brownish, imperforated, covered with short, numerous, rigid hairs; whorls five, but little rounded; suture distinct; aperture very narrow, almost closed by an elongated, lamelliform tooth, situated on the pillar-lip, and circularly joined to the outer-lip at the base. Outer-lip reflected back upon the whorl, and incorporated with it near the base, with a deep sinus in the middle. Breadth one-fourth of an inch.

Lister. Tab. 93. f. 94?

Inhabits moist places. Common.

Vol. I.

B -

In the collection of the Academy.

This species appears to be somewhat allied to the *H. hispida*, but is sufficiently distinct. Found by Mr. Lardner Vanuxem.

H. perspectiva. Shell very much depressed, with about six whorls; whorls striated across, with raised, parallel, acute lines, forming strongly impressed sulcæ between them. Umbilicus very large, resembling an inverted spire, in diameter at least equal to the breadth of the body whorl, and exhibiting distinctly all the volutions. Diameter three-tenths of an inch.

Found by Mr. Le Sueur, near Lake Erie.

H. lineata. Shell very much depressed, somewhat discoidal. Whorls about four, each longer than broad, with numerous, raised, parallel, equidistant, regular, revolving lines. Suture impressed. Umbilicus very large, diameter at least equal to the breadth of the body whorl, and exhibiting all the volutions distinctly. Aperture longer than wide, lunate. Diameter three-twentieths of an inch, nearly.

Collection of the Academy.

Found by Mr. Robert E. Griffith, near Philadelphia. Somewhat resembles the last, but is more depressed, and the striæ are transverse, not longitudinal as in that shell; the cavity beneath also, though of equal proportional diameter, is not proportionally deep.

*Descriptions of several New Species of North American
Insects. By Thomas Say.*

ORDER.—COLEOPTERA.

Genus.—CICINDELA. *Lin. Fab. &c.*

Antennæ inserted into the anterior margin of the eye. *Palpi* filiform, the intermediate and posterior ones nearly equal, penultimate joint of the latter hairy. *Thorax* short. *Elytra* flat, rounded at the tip. *Clypeus* shorter than the labrum.

SPECIES.

1. *C. formosa*. Red-cupreous, brilliant. Elytra with a three-branched broad white margin.

C. formosa. American Entomology, Plate VI.

Inhabits the sandy alluvions of the Missouri, above the confluence of the river Platte.

Front hairy. Labrum large, pale, three toothed. Elytra with a broad white border; anterior and posterior branches short, intermediate one flexuous, nearly reaching the suture; edge of the elytra green. Body beneath green or purple-blue, very hairy. Length seven-tenths, breadth one-fourth of an inch.

A large and very beautiful species, taken by Mr. T. Nuttall.

2. *C. decemnotata*. Green, above tinged with cupreous. Elytra margined with bright green or blueish, four white spots and an intermediate refracted band.

C. 10-notata, American Entom. Plate VI.

Inhabits with the preceding.

Lip three-toothed, white; *mandibles* black, white at the base. *Elytra* with a white spot on the shoulder; a second one equidistant from the first and the band, which is broad, arising from the middle of the margin, refracted at the centre of the elytron and terminated near the suture in a line with the tip of the third spot; third spot large, orbicular, and placed near the external tip of the terminal one which is transverse and triangular. Body beneath green: tail and trochanters purple.—Length three-fifths of an inch nearly.

The specimen from which this description was taken is a female, it was found by Mr. T. Nuttall.

3. *C. dorsalis*. Brassy: Elytra white; two curved lines on each, suture and curved branch near the base green: lip and tail pale.

Inhabits New Jersey.

Head brassy, naked, with green edges. *Labrum*, *mandibles* and *palpi* white; tips of the mandibles and terminal joint of the palpi dusky. *Thorax* brassy, varied with green, margin and back longitudinally hairy. *Scutell* green. *Elytra* white, irregularly punctured; suture green, a lunated branch on each elytron terminating at the middle of the base; disk with two abbreviated lines, of which the anterior is curved outwards and the posterior one inwards, respectively terminating at one of the ends opposite the centre of the other. *Body* beneath hairy on the sides; hair short, prostrate, cinereous; last segment of the abdomen and tail yellowish. On the sea beach of New Jersey; numerous.

4. *C. hirticollis*. Dull brownish-cupreous, beneath green; trunk and head with cinereous hair; lip white;

outer margin of each elytron white, with two abbreviated bands, and an intermediate refracted one; trochanters purple.

Inhabits North America.

Head coppery, varied with green and blue. *Labrum* and base of the mandibles white. *Thorax* very hairy, impressed lines blue. *Elytra* punctured irregularly with green, a marginal lunule at base, the extremities of which are almost equally prominent; the band is divaricated on the margin so as to join the anterior lunule, but is interrupted before the terminal lunule, abruptly refracted at the centre of the elytron and curved near its termination, towards the suture. *Body* beneath green, very hairy. Length rather more than half an inch.

Common in Pennsylvania, very much resembles *C. trifaciata*, for which it is probable it has generally been mistaken.

5. *C. pusilla*. Above black, obscure; elytra with two lunules and a recurved band, white. Body beneath black-blue, or greenish. Trochanters testaceous.

Inhabits with the first.

Elytra with a marginal lunule at base and another at the tip, both very narrow and white; an intermediate band, divaricate on the margin, recurved at the middle of the elytron and terminating near the suture behind. *Labrum* and base of the mandibles whitish; the four basal joints of the antennæ purple.

Length not quite half of an inch. Found by Mr. Nuttall. The band is often obsolete, or only detached portions of it are visible, the enlarged marginal part is permanent.

*Genus NEMOGNATHA. Illiger, ZONITIS of Fabr.
and Latr.*

Maxillæ very much elongated, inflected, filiform.

SPECIES.

N. Immaculata. Lemon yellow, immaculate. Elytra with scattered punctures. Maxilla not longer than the thorax, and with the antennæ and palpi black.

N. Immaculata, American Entom. plate III.

Inhabits the plains of the Missouri.

Antennæ black, basal joint pale testaceous. Eyes, maxillæ, palpi, tips of the thighs and tarsi black. Elytra irregularly punctured, naked, polished.

Comes near to the description of *Zonitis palida* of Fabricius, but that insect is said to be large, and may probably be a true *Zonitis*. Our specimens are not more than half the size of *N. Vittata*.

Found on thistles (*Cardui*) by Mr. Nuttall; numerous.

Genus ZONITIS. Fabricius and Latreille.

Maxillæ not elongated. Antennæ with the first and third joint of the same length, the second a little shorter, the third and following cylindric, the last one fusiform, terminating abruptly in a short point.

SPECIES.

Z. bilineata. Ferruginous. Elytra pale yellowish, with a black fillet. Scutel black.

Inhabits with the preceding on thistles.—Nuttall.

Antennæ black, the two basal joints ferruginous. *Eyes* black. *Elytra* naked, punctured, the fillet occupies the middle of each elytron and is abbreviated at the base and apex. *Scutel* black. *Tibia* fuscous. Less than the preceding insect. In its colour and appearance, except as to size, it resembles *N. Vittata*.

ORDER DIPTERA.

Genus DIOPSIS.

Head furnished with two inarticulate, immovable horns. Eyes situated at the extremities of the horns. Antennæ small, placed beneath the eyes.

D. brevicornis. Black, pedicels short, not so long as the interval between their bases.

Inhabits Pennsylvania.

Head rufous; *vertex* brown, *thorax* blackish, a little blended with cinereous, a lunate impression on each side before, an impressed band on the middle interrupted on the back; and an impressed, angulated one behind. Lateral spines short, black; posterior ones longer, rufous. *Wings* fasciated with brown near the apex. *Feet* rufous, thighs, and tibia towards the tips, blackish, anterior thighs thickened. *Poisers* white. *Abdomen* black immaculate.

Length rather more than three-twentieths of an inch.

Extremely rare; I found but a single individual in May last seated on a leaf of the Skunk Cabbage, (*Pothos Fœtida*) near the Wissahickon Creek a few miles from this city. This insect will be considered as a most interesting addition to the American Fauna.

The insects above described I believe to be new, at least they are not noticed in any book to which I have access.

Observations on the genus Eriogonum, and the Natural Order Polygonaæ of Jussieu. By Thomas Nuttall.

The present genus, which appears to have escaped the observation of Walter in his *Flora Caroliniana*, was discovered about 20 years ago by the late Andre Michaux, and afterwards published by him in his "Flora Boreali-Americanæ," accompanied by an indifferent figure.* The *Eriogonum tomentosum*, like the *Mitchella*, the *Cephalanthus*, the *Sanguinaria*, or the *Pedophillum*, remained for about 15 years at once a genus and a species, and though at the present time at least 5 other species are known to exist on the great plains of Upper Louisiana and the North-West Coast of America; the *Eriogonum* of Georgia and South Carolina possesses a peculiarity of habit, sufficient to establish it as the type of a separate section of the genus.

In a natural arrangement, though, with some striking singularities, the *Eriogonum* directly associates with the *Polygonaæ* of Jussieu, and approximates considerably to the genus *Rheum*; so important in medicine, it appears also from popular opinion as well as familiar experiment in those countries where the *Eriogonum tomentosum* is indigenous, to be possessed in some measure of similar medicinal virtues, for which reason in some parts of Georgia it is called "Wild Rhubarb." As the generic characters of *Rheum* and *Eriogonum* now stand, it is not impossible, as I know by experience, but that even botanists may be led to confound them. Near, however, as these two genera may appear to be allied by a few ob-

* Vol. 1. page 246. plate 24.

scure and artificial characters, the great dissimilarity of habit which they constantly present, strongly indicates a radical diversity of constitution, and of how much importance this habitus or constitution itself may often prove in studying the intricate affinities of the vegetable kingdom, the example before us adduces an additional evidence.

It is a fact somewhat singular, that all the genera of the order *Polygoneæ* hitherto known except *Eriogonum*, are furnished with alternating leaves, sheathing the stem at their base, or with distinct stipulæ rising considerably above the base, and also embracing the stem; cylindrically in the genus *Polygonum*, and are then called *ochreae*. In the *Eriogonum*, however, as in the rest of the order, the laminæ of the leaves before their developement, are on either side rolled under towards the mid-rib, or central vessels. The seeds are also furnished with a farinaceous perisperm which surrounds the corculum or embryo; we shall likewise perceive in the course of our examination of this genus, that though the leaves of the stem and the general involucrum of the scape are constantly verticillate and destitute of stipulæ, yet in the two recently discovered and almost stemless species, the leaves are alternately disposed upon the elongated caudex, and that at a particular season of the year, the leaves then imperfectly developed or rather restrained in their growth, produce sheathing petioles. In the present order, the *Koenigia* of Iceland, the terminal leaves, or those which subtend the fascicles of flowers are verticillate in fours, while the rest of the leaves are alternate and furnished with intrafoliaceous stipulæ.

It would still, perhaps, be better in assigning the limits of this very natural order, to add to the assigned ha-

bitus, in order to prevent the possibility of excluding the present genus, "Leaves generally alternate, rarely verticillate, furnished at their base with sheathing stipulæ, (in *Eriogonum* obsolete or none!) laminæ of the younger leaves rolled under, stem for the most part herbaceous, sometimes arborescent."*

The better to understand the genus *Eriogonum* I shall now proceed to the description of the 3 species which have, to the present time, been exclusively discovered

* This order now contains the following genera. 1st. *Coccoloba*,—all the species trees or shrubs. The *Coccoloba pubescens* of the tropics becomes a tree from 60 to 80 feet high, with extremely hard wood and enormous orbicular leaves. 2d. *Atraphaxis*, of which there are two species, both shrubby, one with spiny branches, in Media and Siberia, the second a native of the Cape of Good Hope. 3d. *Polygonum*, of which there are two shrubby species, and upwards of fifty others which are herbaceous, and several with twining stems. 4th. *Polygonella* of Michaux, a small and extremely branching shrub, no where in the United States more abundant, and occurring, indeed, in scarcely any other place but the sterile sand hills round Wilmington, in North Carolina. It is referred to the genus *Polygonum* as *P. polygamum* by Ventenat, but appears to be a distinct genus, having almost the seed and fruit calix of *Rumex*. 5th. *Brunichia cirrhosa* a single species, being a scandent shrub, common to the Bahama islands, and the Southern parts of the United States, its northern limits as far as I have been able to ascertain, appear to be the southern border of Savannah river. I have found it near Ebenezer bridge, 25 miles above Savannah in Georgia, further to the south, and particularly around New Orleans, it is extremely abundant. The flowers are produced in branching panicles, disposed in numerous fasciculi, the calix is tubular and ventricose, 5-parted, rather ringent, and angular, membranaceously complanate, and attenuated towards the peduncle, which is extremely slender. The seed, which is solitary, as in the rest of the order, is inclosed by the persistent calix, which becomes coriaceous, and suberose, with the lacinia then a little reflected.—There is no capsule, as described by Persoon, a simple seed with a double coating as in all the *Polygonaceæ*, terminated by three short styles, each having a 2-lobed stigma, the seed is conic and triquetrous, the angles acute above, obliterated below. The perisperm is farinaceous, distinctly 3-lobed, and the lobes again semibifid, the *corculum* is inverted, the seed lobes are flat and erect, linear-oblong, generally immersed in the perisperm, sometimes only regarding one of the lobes; the radicle is exserted beyond the perisperm, touching the base of the styles. The character of an inverted corculum, given as one of the generic distinctions of the present genus, is consequently of no importance,

within the limits of the United States and its territories; of the two species briefly noticed by Mr. Pursh, discovered by Mr. Bradbury and myself, scarcely any thing is as yet distinctly known. In consequence of these and other accessions, it appears necessary to modify the genus with more precision.

as it appears common to the whole order of *Polygoneæ*. 6th. *Rumex*, containing at least forty-five species, all herbaceous. 7th. *Rheum*, containing eight species, all herbaceous except *R. hybridum*. The *Rheum Rhaponticum*, indigenous to Thrace; the *R. undulatum*, to China and Siberia; the *R. palmatum*, to China; the *R. compactum*, also to China and Tartary; the *R. tataricum*, with extremely large leaves, to Lesser Tartary; the *R. Ribes* inhabits Persia, Lebanon, and Carmel; the *R. hybridum* belongs to Northern Asia, and is a shrub; lastly the *R. leucorrhizum*, discovered by Pallas, indigenous to the mountainous deserts of Songarica in Siberia. 8th. *Eriogonum*, containing about five or six species, herbaceous or suffruticose, chiefly inhabiting the desert plains of North America, on either side the Northern Andes. 9th. *Triplaris*, two species, both trees; the *T. Americana*, native of the woods of Carthagena and Guianne, a tree forty feet high, with a dense pyramidal summit, the second species grows also in the forests of Carthagena. A revisal of the generic character of this genus is also absolutely necessary, in order to separate it effectually from the genus *Eriogonum*, there being at present as this order is now understood, not a single artificial generic character given in the genus *Triplaris*, except its being a dioecious plant, but what equally applies to *Eriogonum*, although there can be no doubt of the existence of a distinct generic character, when we for a moment consider the great disparity of habit. Jussieu, however, remarks that the seed of this genus is a nut. 10th. *Calligonum*, of which there are three species with the *C. Pallasia*, which has been considered as a distinct genus, all shrubs nearly destitute of leaves, with dichotomous and articulated branches; the *C. Polygonoides*, was found by Tournefort on Mount Arrarat; the *C. comosum* is a native of Egypt and Barbary; the *C² Pallasia* was discovered by him whose name it bears, in the deserts towards the Caspian sea. 11th. *Koenigia islandica*, a small and rather succulent plant, peculiar to the isle of Iceland. To these we may perhaps venture to add the *Plegorhiza adstringens* of Molini, a plant of Chili, which, as far as the description extends, appears to be almost a species of *Eriogonum*, possessing in every respect its habitus. By Jussieu, for the want of a correct description it was necessarily placed among the " *Plantæ Incertæ sedis*," with an indication that it ought to be compared with this order, or the *Lauri*. From this statement, it appears, that America possesses eight out of the twelve genera of the order *Polygoneæ*. Most of the plants of this order are more or less astringent and bitter. The most astringent of medicines, the gum *Kino*, is the produce of the *Coccoloba*.

ERIOGONUM.

Artificial CLASS and ORDER.

ENNEANDRIA TRIGYNIA.

Generic Character.

Calyx subcyathiformis, basi tubulosa, limbus sexfidus inæqualis, extus villosus. *Corolla* nulla, semen unicum, triquetrum, immarginatum, calyce tectum. (Flores involucrati. Stipula nulla.)

Observation.—Mode of growth proliferous; stems, leaves, and flowers persistent; with an imperfect prostrate or cespitose stem or caudex, the peduncles or scapes then umbelliferous; when with a distinct stem, erect, and dichotomous; leaves connate and verticillate, on the caudex alternate, always more or less tomentose. Flowers upon articulated peduncles, produced in cup-shaped, campanulate involucres, the *involucri* many flowered, simply producing flowers or peduncles mixed with setaceous appendices, which are simple or plumose. Calyx unequal, 6-parted, subcyathiform, externally villous, covering the seed, the 3 exterior segments reflected in the fruit. Stamens 9, filaments villous at the base, longer than the calyx, disposed by 3s, (as in *Rheum*) on the base of the larger calycine laciniae; base of the calyx tubular to the circular articulation. Styles 3, simple, obtuse, long as the stamens, villous below as well as the germ. Seed acute or obtuse triangular, acuminate above, at length, in germination, bursting below, seed compressed? ovate, acute. Perisperm small, farinaceous; corculum inverted. Seed-lobes erect, flat, oboval; radicle straight, exserted.

§. 1. Caule erecto dichotomo; foliis verticillatis.

1. Tomentosum. MICH. E. Caule dichotomo, nodoso; glomerulis floriferis terminalibus axillaribusque; involucris cylindraceo-campanulatis, angulatis, solitariis, sessilibus; calicibus fructiferis valde inæqualibus, extus villosiusculis; seminibus angulis acutis; foliis subternis, supremis connatis, oblongo-ovalibus, supra glabris subtus ferrugineo tomentosis; involucris receptaculis plumoso-piliferis.

Description. Root fusiform, perpendicular, rarely divided below, nearly destitute of fibres, of a brittle consistency, and of a brownish red colour, sensibly bitter and astringent to the taste. Stem herbaceous, cylindric, somewhat tomentose, obsoletely striate, of a rigid and almost woody texture. Branches dichotomous, erect, subdivided 7 or 8 times. Radical Leaves petiolate, alternately disposed upon the caudex, rather long, oblong obovate, obtuse, somewhat coriaceous, opaque, smooth on the upper surface, covered with a short and dense ferruginous white tomentum on the under side. Leaves of the stem verticillate, mostly by threes, rarely by fours, almost connate at the base, seated around the joints of the stem, generally of an oblong-oval figure, destitute of stipulae, decreasing in size towards the summit, they then become ovate lanceolate and acute, and more distinctly growing together at their common base form a general involucrum to the fasciculi of flowers. Inflorescence, flowers disposed in dichotomous terminal panicles, several (15 to 20) produced (after the manner of compound flowers) in a partial campanulate involucrum or involucellum, each seated upon a smooth, recurved setaceous pedicel, articulated to the tubular base of the calyx. Involucrum sessile, solitary, generally terminal, sometimes in the angle of the dichotomous lower branches (in specimens

imperfectly developed axillary,) pentangular, with a four or five toothed border, producing intermingled with the pedicells plumose filaments a little longer than the involucrum, most conspicuous in fruiting specimens. *Calyx* subcyathiform, 6-parted, persistent, unequal, pubescent around the exterior nerve, acute, and tubular at the base; 3 of the *interior* laminæ longer than the *exterior*, erect and connivent, enlarging after inflorescence, then cordate, oval, and enveloping the seed; the three *exterior* segments shorter, in fruit reflected, cuneate-oval, obtuse, and concave. *Stamina* 9, disposed by 3's, on the base of the larger divisions of the calyx. *Filaments* a little longer than the calyx, pubescent towards the base. *Anthers* short, oblong, oval, two celled. *Germ* conoid-ovate, acute. *Styles* 3, filiform, simple, a little longer than the stamens, pubescent towards the germ. *Stigmata* minute, obtuse. *Seed* conic, acuminate, acutely triangular, smooth, shining, and of a testaceous colour; in a marcescent state, at the period of germination, partly opening at the base like a trivalvular capsule, *seed* within the proper integument compressed only on two sides? oval, acute, of a dark brown colour. *Corculum* inverted, flat and erect. *Radicle* exserted, straight, obtuse, in a direction contrary to the peduncle. *Cotyledones* large, oboval, green. *Perisperm* small, farinaceous, extremely white, scarcely covering the seed lobes.

Stature. Stem about three feet high. *Root-leaves* four to six inches long and one inch broad. Conspicuous stem leaves about an inch long, extreme involucrate leaves scarcely half an inch. It begins to flower the second year in July and August, the flowers are whitish; it does not appear to endure more than from seven to ten years, and is perfectly prolific never sending off surculi or lateral stems.

Habitat and Geographic limits. It abounds throughout the sandy and sterile forests of Georgia and South Carolina, always beneath the shade of the *Pinus australis*, from the banks of the river St. Mary's in West Florida to the immediate neighbourhood of Orangeburgh (Orangeburgh county, S. Carolina) where it suddenly disappears, nowhere appearing to have crossed the Santee to the north. In the direction of its longitude it does not descend so low towards the sea coast as Savannah in Georgia or the city of Charleston in S. Carolina, neither is it on the other hand to be met with beyond the terminating line of the ancient maritime soil, so exactly defined by the natural limits of the long leaved pine, which the *Eriogonum* constantly accompanies in all its western limits; thus it disappears above Augusta in Georgia, where hills of deciduous trees (oaks, hickories, &c.) and primitive soil commence, and only again very transiently appears in insulated portions with the *Pinus australis*.

(To be continued.)

NOTICE OF THE LATE DR. WATERHOUSE.

DIED on the 18th of May, 1817, at Charleston, S. C. Dr. JOHN FOTHERGILL WATERHOUSE, aged 26 years. He was born at Cambridge, Massachusetts, and received his classical, and the rudiments of his medical education, at Harvard university.

The preeminent reputation of the Medical School in this city, induced him to complete his medical education in the university of Pennsylvania, where he graduated as Doctor of Medicine in the spring of 1813. Upon the completion of his studies, and at the solicitation of his friends, he fixed his permanent residence in this city, and soon after became a member of this Society.

Under the auspices of the Academy of Natural Sciences, he delivered, in conjunction with Dr. Barnes, during the spring of 1814, and the succeeding spring of 1815, two courses of popular Lectures on Botany.*

Dr. Waterhouse's exertions were not confined to botanical pursuits; in the winter of 1815 he delivered in the museum of the Academy, a short elementary course of lectures on comparative Osteology, and during the following season, a like course on Ichthyology.

His active exertions in the other departments of natural history, also contributed to advance the interests of this, then infant institution, and much of its present respectability may be ascribed to his individual efforts.

An enthusiastic attachment to natural history, and an anxious solicitude for honourable distinction, prompted him to intellectual exertions, incompatible with his delicate constitution, naturally disposed to pulmonary disease.

Unable to sustain the pressure of persevering application, he was attacked in the spring of 1816 with Hœmoptysis, which was succeeded by symptoms of pulmonary consumption. Relieved by the exertions of his medical friends, from the severer symptoms of his disease, he was advised to avail himself of the mild winter of a southern climate, and accordingly departed—never to return.

It has been frequently and justly remarked, that life should not be computed by the number of years an individual has lived, but by the labours he has performed; considered in this light, Dr. Waterhouse has lived to mature age—he has fulfilled the duties of life in the short period of a youthful career.

This brilliant dawn promised a meridian of splendid usefulness—but in the language of his affectionate father, “where are now the fruits of his learning, his rare talents and his matchless industry!”

* These were the first popular lectures on Botany delivered in this city. Upwards of two hundred ladies, besides a considerable number of gentlemen, attended the first course, and the audience to the second was still more numerous.

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Observations on the genus Eriogonum, and the Natural Order Polygoneæ of Jussieu. By Thomas Nuttall.

(Concluded.)

§. 2. *Humifuso, subacaule, scapo umbellifero.*

2. *Flavum*, E. herbaceum, cæspitosum, acaule; caudex multiplex indivisus; scapo umbellato subquinquepartito, involucrum tri vel tetraphyllum, involucellum subteretis campanulatum multiflorum; calycibus extus sericeo villosis; seminibus teretiusculis; foliis spathulato-obovatis, supra villosis, subtus lanato-tomentosis albidis; involucellis receptaculi nudis.

Eriogonum flavum. T. Nuttall in Fraser's Catalogue, 1813. *E. sericeum.* PURSH, *Flora Americæ Septentrionalis.* Vol. I. p. 277.

Description. Root somewhat fusiform, long and perpendicular, of a reddish brown colour, destitute of fibres, and usually coated with numerous thin sphacelate brownish black integuments, apparently the remains of so many annual increments. True stem none. Caudex many-parted, unbranched, in old plants profusely cespitose. Leaves radi-

cal, circularly fasciculate, persistent, spathulate-obovate, entire, obtuse, attenuated downwards about half their length, on the upper side softly villous, and of a pale green; beneath lanuginously tomentose and nearly white; distinct stipula none! (autumnal foliage very short, and oblong-oval, not attenuated, the petiole extremely villous and much dilated, entirely embracing, and by their imbrication closing and protecting the summit of the caudex, throughout the winter, after the manner of the genus *Rheum*) *Scape* round, villous, umbellate at its extremity. *Umbelluli* 3—5, about an inch long. *Involucrum* consisting of three or four connate, linear-oblong leaves. *Involucellum* cyathiform-campanulate, round, very many flowered, (20—30) about five-toothed, and destitute of plumose setaceous appendices on the receptaculum. *Calyx* cyathiform, 6-parted, tubular and acute at the base, circularly articulated upon the peduncle, externally covered with a silky villous; *laminæ* nearly equal in inflorescence, oblong-oval, and obtuse, the three interior segments a little larger, all of a bright yellow. *Stamina* 9, filaments longer than the calyx, villous below. *Anthers* short, oblong-oval, two-celled; *styli* 3. divaricate above and below, filiform, villous at the base. *Stigmata* very minute, obtuse. *Germ* subcylindric ovate, extremely villous. *Seed* immarginate, cylindric-ovate, obtusely triquetrous, acute; colour testaceous. *Corculum?*

Obs. The laminæ of the younger leaves are revolute, when full grown from two to three inches long and from five to ten lines wide; length of the scape from six to twelve inches. It begins to flower the second year, continuing through July and part of August. Flowers without any remarkable odour. From the exfoliations of the root, and

the annual vestiges of the leaves upon the elongated caudex, some very old plants might be of from ten to fifteen years duration.

Habitat. On arid denuded argillaceous hills and broken soils; from the Arikare village to the northern Andes? or the mountainous sources of the Missouri.

Medicinal virtues. Probably very similar to those of rhubarb, in common with the *Eriogonum tomentosum*. Root to the taste sensibly bitter and astringent.

3. *Parviflorum*, E. caule suffruticosa subcæspitosa humifusa; scapo umbellato plerumque nudo; involucellis subcylindraceis, angulatis, sessilibus, floribus nudis sæpius intermixtis, omnibus parvulis, extus puberulis; foliis spathulato-obovatis, basi promisse attenuatis utrinque subtomentosis canescensibus; involucellis receptaculi setigeris, setis nudis.

E. pauciflorum, PURSH. *Flor. Am.* Sept. in Supplementum, vol. ii. p. 735.

Description. Root somewhat fusiform, ligneous, branching below and without fibres. Stem prostrate, proliferous, suffruticose, considerably divided, roundish, covered with a downy white tomentum almost equally spread upon every part of the plant, furnished at the base of the branches with autumnal gemmaceous scales, or the vestigiae of abortive leaves. Leaves alternate! narrow, spathulate-obovate attenuated three fourths of their length, entire, two to three inches long, and scarcely a quarter of an inch wide. Scape umbellate, round, rather short (four to six inches long;) involucrum, generally none, or of one or two short setaceous leaves. Involucellum sessile, many flowered, subcylindric-cyathiform, angular, with a border of five or

six setaceous teeth; naked pedunculate flowers are sometimes intermixed with the involucelli. Flowers small, whitish, short cyathiform, seated upon articulated peduncles; *laminæ* a little pubescent externally, oval, unequal. *Stamina* 9. *Styles* 3, longer than the stamens, pubescent towards the base, apex obtuse. *Receptaculum* of the involucelli producing smooth setæ nearly the length of the peduncles.

Habitat. On high and arid argillaceous hills from Fort Mandan, or the great northern bend of the Missouri, to the mountains? with the former. Flowers in August.

Of the same alpine habit (viz. furnished with prostrate or cespitose stems, and umbellated peduncles or scapes) are two other species of this genus collected on the northwest coast of America by Mr. Archibald Menzies and now deposited in the Herbarium of Sir J. Banks. They appear to be described in Rees Encyclopedia under the names of *E. parvifolium* and *E. latifolium*, and are said to be shrubby; probably suffruticose.

Thus the genus *Eriogonum*, as yet peculiar to North America, approximating so nearly to *Rheum*, may probably form a numerous genus, whenever the great plains of *California*, the *Columbia*, the *Missouri* and the *Arkansa* shall be explored.

To distinguish these two approximating genera with more precision, we shall add the following description of the seeds of *Rheum Rhaponticum*, or officinal rhubarb.

Calyx 6-parted, persistent, smooth, very small, unequal, and closely investing the base of the seed, the three larger oblong-oval segments appressed to the fruit, the three smaller divisions reflected; stamens disposed by 3's opposite the larger laciniæ of the calyx. *Seed* acutely triangular,

compressed and almost three lobed, large, furnished with broad curved and reticulated membranaceous margins, when mature greatly enlarged beyond the calyx, external integument closely adnate, interior obsolete, charged with the peculiar colouring matter of the root. ("Style 0. stigmata 3." JUSSIEU.) deciduous, or obsolete in the membranaceous lobes of the fruit; *perisperm* farinaceous, almost three lobed; *corculum* immersed, inverted, erect and flat; *radicle* exserted through the perisperm; seed lobes ovate.

The seeds of *R. undulatum* and *R. compactum* are so very similar to those of the *R. Rhaponticum* that the same description answers to the three, excepting that the seed lobes of the two former appear a little more acute.

From what we can discover then it appears that the *Eriogonum* ought to be placed in the class *Enneandria* and the order *Trigynia* of Linnæus instead of *Monogynia* where it was placed by Michaux, by Persoon, and where it still remains in Mr. Pursh's Flora of North America, and is generically distinguished from *Rheum* as follows:

RHEUM.

Enneandria trigynia.

Calyx sexfidus, glabris, persistens *Semen* unicum
triquetrum, alatum, nudum.

Characters of a new Genus, and descriptions of three new Species upon which it is formed; discovered in the Atlantic ocean, in the months of March and April, 1816; Lat. 22° 9'. By C. A. Le Sueur.—Read April 15th, 1817.

I now proceed to the description of a series of animals heretofore unknown; they belong to the extensive family of Pteropode mollusca; and may be arranged near to the

genus Firola, to which they approach by the form of their body, their habit, their manners, and by being inhabitants of the same temperate climates.

The anatomical characters are very similar to those of that genus, but the simple examination of their figures will exhibit obvious distinctive traits. These differences consist, in the position of the nucleus, the heart, and the branchia. In the Firolæ, these organs are placed in a cavity at the base of the tail, by which they are protected from all danger; but in the beings under consideration, they are situated at the posterior extremity of the body; very slightly attached; exposed to every danger; and constantly liable to be separated, in consequence of their unguarded position.

These differences are, I believe, sufficiently great, to authorize the establishing of a new genus, for the reception of the three new species, which are here described; possessing, as they do, a common form of body, and similarity of habits, but at the same time presenting distinct specific characters, by which, on examination, we shall be able readily to recognize them.

For this genus, I propose the name of **FIROLOIDA** under the following characters :

Genus FIROLOIDA.

Generic Characters.

Tentacula none; jaws horny; eyes two; one fin, placed on the back; branchia grouped with the heart, around an oblong nucleus, situated at the posterior and terminal part of the body; tail none.

Body gelatinous, cylindrical, glabrous, very similar to that of the Firolæ; like them they have a proboscis, two

eyes, jaws armed with small, horny, curved, reddish points, arranged in a pectinate manner—two nervous ganglions, one above the eyes and the other at the base of the dorsal fin, united by nervous threads, and furnishing numerous smaller ones, extended to various parts of the body.

The intestinal tube in the first species, is reddish, and extended from the jaws to the nucleus, without any sensible enlargement. In the second species it is abruptly enlarged near the nucleus, and in the third, the intestine is filiform before that part.

The branchia, are proportionally much smaller than in the Firolæ, and the nucleus shorter and more spherical, and of a pale colour.

I have not observed the vermiform organ in the animals under consideration, but in the first and second species a long filiform appendage appears to me to be the oviduct, including small globules resembling eggs; this part is very probably elongated by receiving the eggs, and when these are exhausted it is perhaps detached entirely, and the body then resembles the species fig. 3.

SPECIES.

1. *F. Demarestia*. Body long, glabrous, hyaline, acuminated at each extremity; no gelatinous points.

Plate 2, fig. 1. *b*. position of the eyes and nervous ganglion between them; *a*. oviduct, magnified.

Inhabits the ocean near Martinique, taken in March 1816.

Dorsal fin rounded, nearer to the eyes than to the nucleus. Length of the body two inches.

2. *F. Blainvilliana*. Body short, glabrous, posterior

extremity thicker, and truncated; dorsal fin equidistant between the eyes and the nucleus.

Plate 2, fig. 2. *a.* small specimen; *b.* nucleus and oviduct magnified.

Inhabits near Martinique, taken in March 1816.

Oviduct shorter, perhaps broken, thicker; posterior part of the nucleus furnished with small oviform globules. Length of the body seven lines to one inch and a half.

3. *F. aculeata.* Body subequal, glabrous, hyaline, wrinkled above the eyes. Dorsal fin equidistant from the extremities, longer behind.

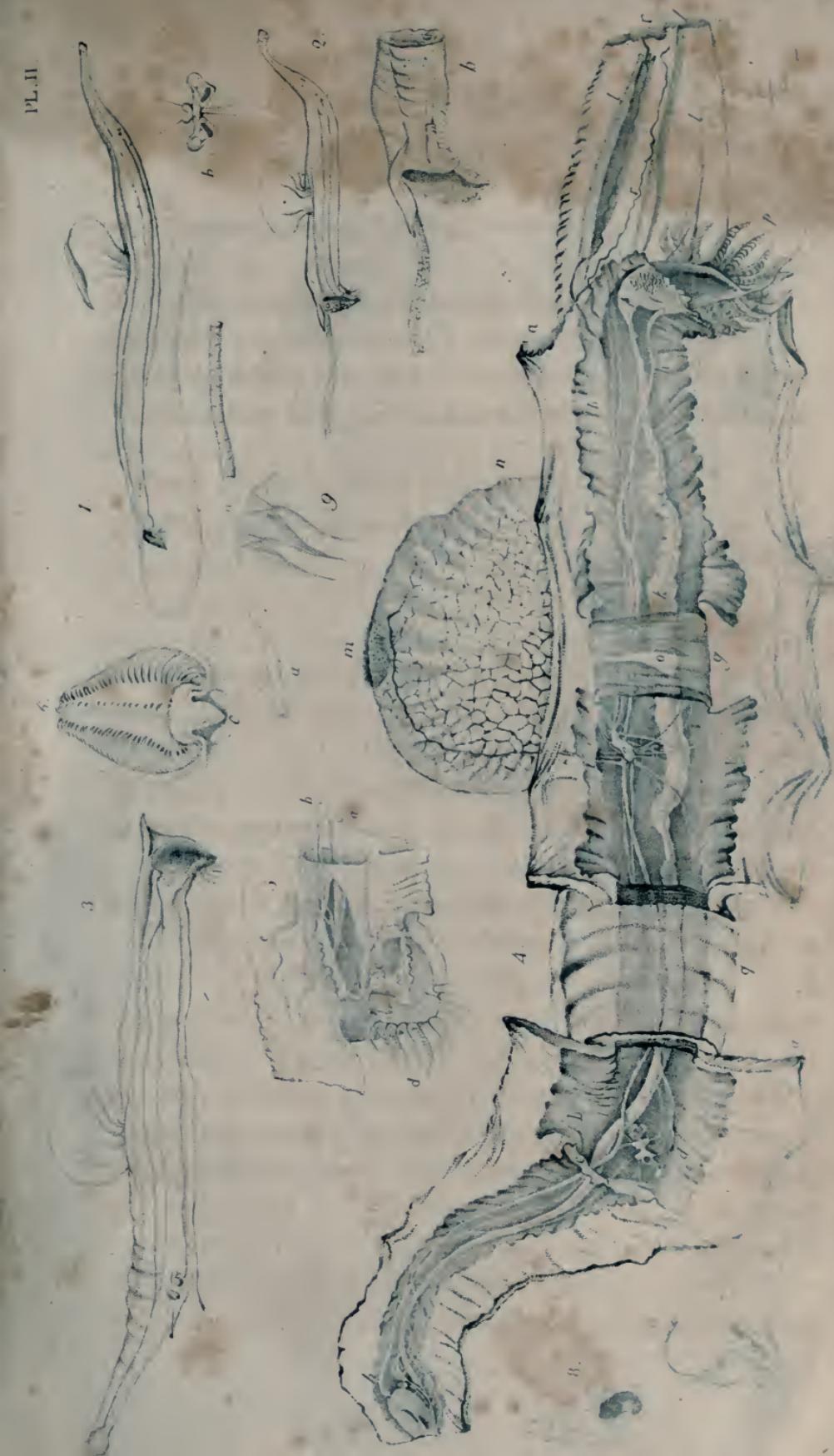
Plate 2, fig. 3, magnified.

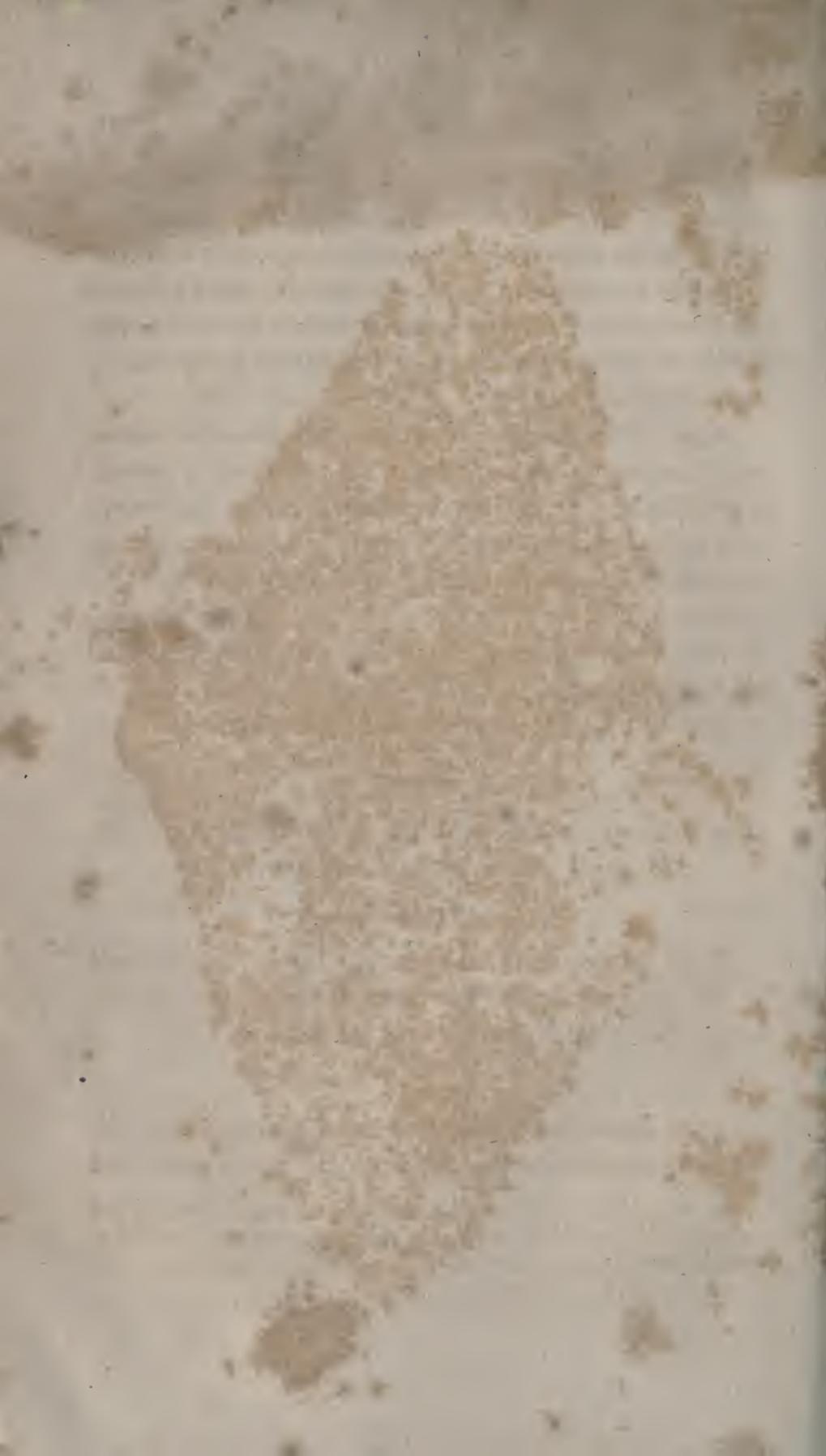
Taken April 26, 1816.

Nucleus suboval—eyes conspicuous; one elongated, gelatinous point beneath the eyes, and another, much shorter, before them—oviduct none.

I here add some anatomical explanations, accompanied with figures of a species of the genus Firola, described in the preceding number.

Plate 2, fig. 4. represents a firola magnified and opened on the side. *a. a. a.* gelatinous, exterior substance of the body, which at *q* remains entire. *b. b. b.* peritoneum opened, and entire at *g*. *c.* diaphragm. *d.* anterior ganglion. *e.* posterior ganglion. *f.* nucleus; it is laid bare of the peritoneum, to exhibit a granulated appearance, on its superior part; very like grains of Indian corn (*Zea*). *p.* branchia. *h. h.* artery. *i. i.* branch of the artery. *k.* intestine. *l. l. l.* caudal muscles. *n.* muscles of the dorsal fin. *m.* cup of the dorsal fin. *o. o.* radicles of the dorsal fin. *r. r.* two small filiform tubes, opening into the posterior part of the peritoneum, and connected with





the ramoso vessels of the extremity of the tail; these, perhaps, serve to eject a portion of the air which may be admitted by the branchia in this larger cavity, so as to enable the animal to preserve a proper equilibrium with the water.

Observation. The connection of these tubes with the cavity of the peritoneum was ascertained by injecting blue coloured water.

Fig. 5. Position of the heart and branchia on the opposite side of the nucleus. *c.* heart. *d.* branchia. *b.* artery. *a.* intestine. *e.* vermiform organ and branch of the artery.

Fig. 7. Retracted jaw. *a.* artery. *b.* intestinal tube. *c.* *c.* nerves. *e.* capitate threads. *d.* interior palpi.

Fig. 8. Eye.

Fig. 6. Jaw exserted, front view with lateral and central teeth. *c.* lip.

Fig. 10. Two pairs of muscles of the dorsal fin.



Description of three New Species of the Genus Raja. By C. A. Le Sueur. Read July 1st, 1817.

Generic Characters.

Body flat; pectoral fins large, extending from the head to the anus; branchial apertures 5, placed beneath the body; nose at tip,* distinct from the face.

SPECIES.

1. *R. Maclura.* Head very broad, snout short, entire, very obtuse; confounded with the pectoral fin; tail

* I have called this part, *tip of the nose*, from its analagous situation with that part of the human face; for the same reason the part called snout may be called the middle of the nose, it is more or less elongated, compressed, or depressed, and joined to the lip by the septa.

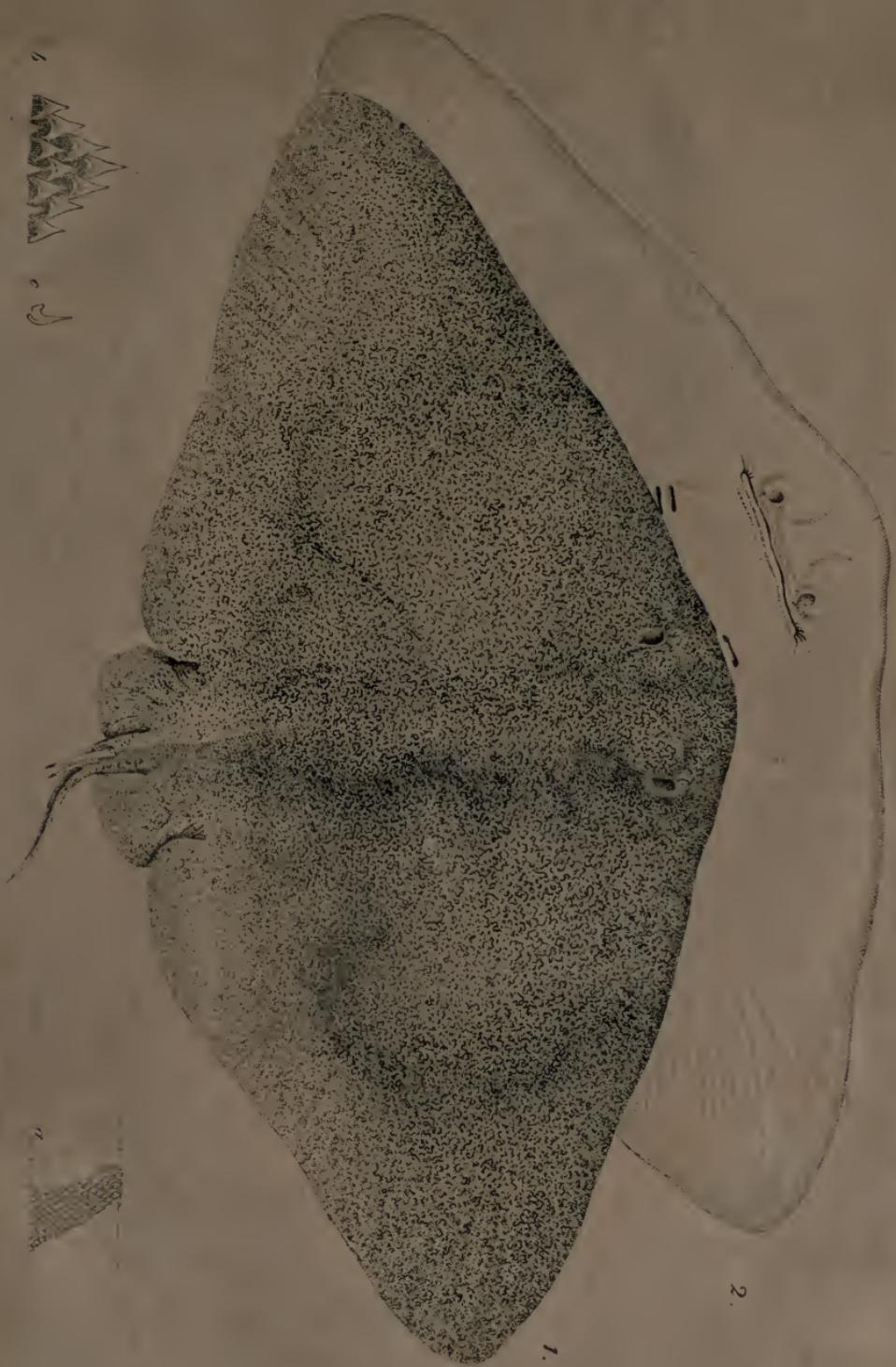
one third the length of the body, destitute of a fin, triangular, one or two spines very near the base.

Head above a little elevated, flattened on the top; pectoral fin forming with the body a transverse rhomboid, rounded at the angles.

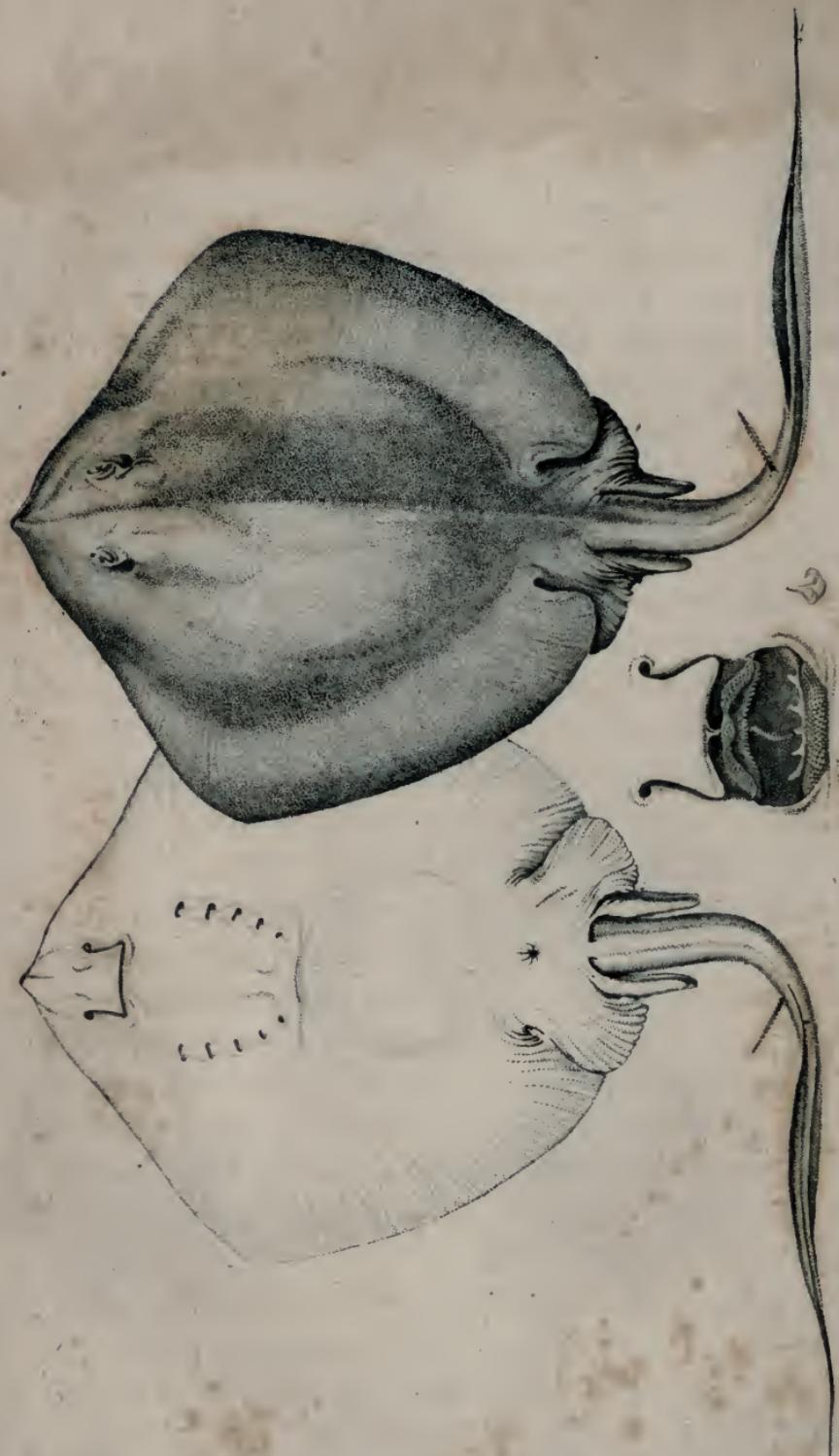
Eyes very small, situated near the edge of the snout; pupil black, round; iris green, radiated with black; *spiracles* large, immediately behind the eyes. *Nostrils* rounded, very near the mouth and distant from each other nearly one half its width; tip of the nose truncated and extending on each side under the nostrils, not covering the upper lip; septa very short. *Mouth* with minute, numerous, triangular, acute teeth, each emarginate at the base for the reception of the hind teeth, which are affixed by a short peduncle to the skin of the jaw and moveable. *Branchial apertures* equal, equidistant; placed perpendicularly behind the angles of the mouth; ventral fins short, rounded; skin shagreened, greenish blue, with small black, vermicular, interrupted lines, and larger distant pale spots. Body beneath pale red.

This description was taken from a specimen found at Newport, Rhode-Island. Width six feet seven inches; length three feet six inches from the anterior extremity to the tip of the ventral fins. Eyes eight inches asunder. Width of the mouth seven or eight inches. It is not used for food. It arrives to a large size, measuring sometimes, it is said by fishermen, fifteen or eighteen feet in width, and appears to be an inhabitant of the sea coast of the United States generally.

2. *R. Say.* Body suborbicular; two elongated, vertical, opposite fins on the tail, behind the spine.



RAYA SAWY.



Body above convex, olivaceous-red, darker near the extremity of the fins; beneath flat, white; broader a short distance behind the eyes; limb entire; head sloping, length from the base to the middle of the nose nearly equal to the distance between the eyes; eyes brown, oblique, not prominent, distance between them moderate; spiracles oblique, near and behind the eyes; nostrils small, placed nearer the angles of the mouth than the middle of the nose; tip of the nose truncated, quadrangular, descending, and closing the mouth; septa short, narrow; mouth small, upper jaw undulated, lower one a little prominent in the middle; armed with several ranges of teeth, teeth dilated, and rhomboidal at base, terminated by an acute point, recurved inwards, and with a longitudinal depression before; lateral teeth more suddenly attenuated. Attached to the superior jaw, within, is a large membrane, laciniated and loose at the margin, serving probably to close the mouth like a valve in order to retain the water and propel it through the branchia; five conic membranous appendages are attached to the lower jaw within, and support the superior membrane during its inflation; and a longitudinal, carinated, loose skin separates the palate in two equal parts.

Branchial apertures, placed obliquely behind the angles of the mouth, on an obliquely curved line; unequal, the posterior one much smaller, and perpendicularly behind the angles of the mouth; ventral fins rounded, with a small process near the tail.

Tail a little longer than the body, thicker and sub-compressed at the base, attenuated, and at the point acute, spine placed nearer the base than the tip; fins thick, smooth, without distinct rays, black, elevated in the middle, gradually disappearing towards the extremities, superior fin

shorter than the inferior one, arising from near the tip of the spine, inferior one arising opposite to the base of the spine.

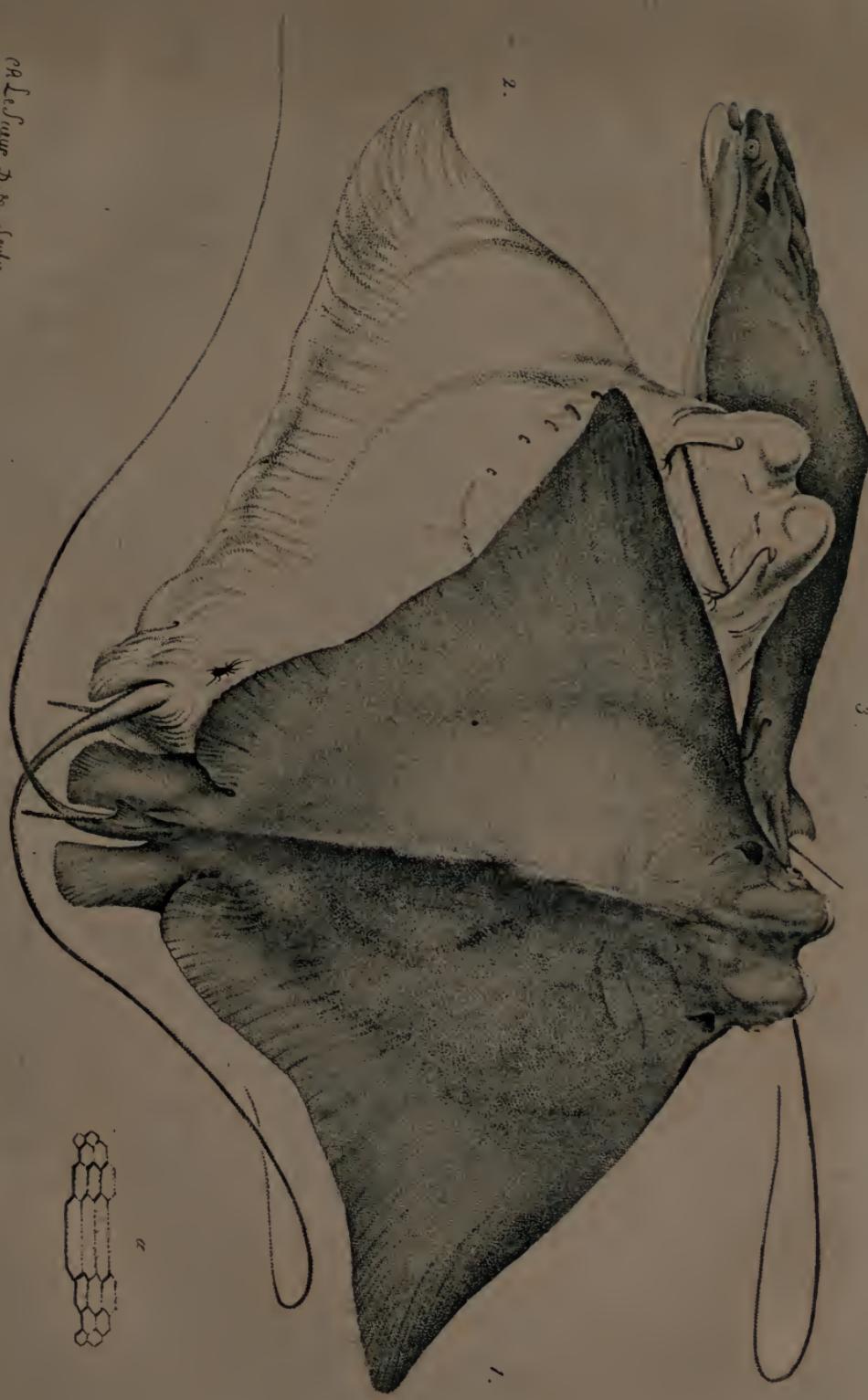
The largest specimen I have seen was eighteen inches long, exclusive of the tail; sixteen or seventeen inches in the greatest width, and four or five inches thick. These dimensions varied somewhat in several individuals which I examined on the bay shore of Egg Harbour, New Jersey.

3. *R. quadriloba*. Body rhomboidal, gibbous; snout divided transversely and vertically into four lobes; the transverse dividing groove gradually disappearing over the jaw on each side. Teeth tabular. Tail armed with a serrate spine.

Body gibbous on the middle of the back, glabrous; pectoral fin narrowed towards a point on each side; colour brownish, olivaceous; beneath flat, white, somewhat red near the tips of the fins. *Head* distinct, sloping, grooved longitudinally above, neck with several protuberances. *Eyes* lateral, vertical, equidistant from the spiracle and the tip of the superior lobes, pupil very small, black, iris yellowish; *spiracle* large. Inferior lobes of the middle of the nose, rather longer than the others; superior ones obtuse, roundish. *Nostrils* equidistant from the tip and middle of the nose; tip of the nose flat, a little dilated, truncate, denticulated, covering the superior jaw, the lateral fold continued a short distance below the angles of the jaw. *Mouth* wide, with several ranges of flat, wide teeth, of different dimensions, central teeth largest, lateral ones diminishing towards the angles of the mouth, those of each row being but a moiety of the preceding ones; jaws applied to each other by a transverse obtuse elevation in the middle. *Branchiostegum*

PR. L. Sauer & Söh.

R. QUADRILATERA



cephal apertures obliquely behind the mouth, on an obliquely curved line, gradually decreasing in breadth to the terminal one, which is small and more distant; ventral fins narrow, a little elongated and obliquely truncated. *Tail* attenuated, very slender, a little longer than the body, with a small triangular fin at base, preceding the spine.

Breadth two feet, length sixteen inches exclusive of the tail; taken at Egg Harbour, New Jersey.

Some account of the Insect known by the name of Hessian Fly, and of a parasitic Insect that feeds on it. By Thomas Say.—Read June 24th, 1817.

ORDER DIPTERA.

Genus CECIDOMYIA.

Genus TIPULA, of Linne and Degeer. CHIRONOMUS, of Fabr. TRICHOCERA, of Lamarck. CECIDOMYIA, of Latr. and Meigen.

Antennæ filiform, joints subequal, globular, hairy. Proboscis salient. Wings incumbent, horizontal.

DESCRIPTION.

C. destructor. Head and thorax black; wings black, fulvous at base; feet pale, covered with black hair.

Inhabits the northern and middle states.

Body clothed with short black hairs; *head* black; *antennæ* shorter than the body, somewhat smaller toward the tip, verticillate, joints moniliform, separated by a hyaline filament. *Thorax* gibbous, black, glabrous and polished. *Scutel*, prominent, colour of the thorax, rounded behind. *Wings* ciliate, rounded at tip, blackish, the fulvous colour of the base is sometimes extended upon the nerves of the wing, paler and gradually disappearing before the middle; longer than the abdomen. *Feet* long,

slender, thighs fulvous at base, furnished at the tip with several very acute claws. *Poisers* pale, nearly as long as the thorax, with a suboval capitulum. *Breast* sometimes fulvous. *Abdomen* brownish.

F E M A L E. *Antennæ* longer than the thorax, the joints somewhat oval, not separated by filaments. *Abdomen* elongate-oval, above rectilinear, beneath somewhat ventricose, fulvous, with a dorsal and ventral black vitta widely interrupted by the sutures. *Tail* more or less acute in the dead specimen in proportion as the oviduct is exserted. Length rather more than three-twentieths of an inch.

Eggs elongated, linear, pale, fulvous.

L A R V A. *Body* somewhat fusiform, whitish; *tail* acute, rather abruptly attenuated; *head* incurved, and attached by the mouth; above hyaline, exhibiting an internal, abbreviated, visceral, green line; beneath with opaque white clouds, which in the young animal are perfectly separate and about nine on each side, with an intermediate series of smaller ones; as the larva advances to its full stature, these unite so as to exhibit the appearance of regular transverse segments; near the anterior extremity are the rudiments of feet resembling obsolete tubercles, or crenulae; when taken from the culm it is almost inert, exhibiting very little motion to the eye. Length three-twentieths of an inch, breadth one twentieth.

P U P A—resembles the mature larva, but is of a dark reddish brown colour; and appears perfectly inert.

This well known destroyer of the wheat has received the name of "Hessian fly," in consequence of an erroneous supposition, that it was imported in some straw with the Hessian troops during the revolutionary war. But the truth is, it is absolutely unknown in Europe, and is a species entirely new to the systems—being now for the first time described. The insect described by Mr. Kirby in the Trans. Lin. Soc. of Lond. vol. iv. p. 232, and named by him *Tipula Tritici*, is without doubt of the same genus with this, but specifically distinct.

The history of the changes of this insect, is probably briefly this—The eggs are deposited by the female in different numbers from one to eight, and perhaps more, upon a single plant of wheat, and in so doing the parent exhibits another instance of that provident care for the welfare of her offspring, which is so strongly evinced by many of the insect race. The egg is not placed at the axilla of either of the leaves indifferently, but displaying some portion of botanical knowledge, the fly carefully insinuates her elongated oviduct between the vagina of the inner leaf and the culm nearest to the root of the plant, where the larva when excluded from the egg will be in immediate contact with the culm, from which alone its nourishment is derived. In this situation with the body inverted, the head being invariably towards the roots, or if above, towards the first joint, the infant larva passes the winter. The pressure and puncture of the insect in this state of its being, upon the culm, produces a longitudinal groove of sometimes sufficient depth to receive almost one half of the side of its body. When several of them are contiguous on the same plant, the pressure on the body of the larva is unequal, and an inequality in the form of the body is the consequence, as well as the destruction of the plant which is subjected to their attack. The perfect fly appears early in June, lives but a short time, deposits its eggs and dies; the insects from these eggs complete the history by preparing for the winter brood.

ORDER HYMENOPTERA.

Genus CERAPHRON. *Latr.*

Antennæ infracted, moniliform, ten or twelve jointed, basal joint long, cylindrical. Abdomen subovate. Inferior wings without apparent nerves. Superior wings with a costal nerve, and a single branch, forming an incomplete radial cellule.

SPECIES.

C. destructor. Black, granulated; abdomen glabrous, polished; feet, and base of the antennæ, whitish.

In the Larva of Cecidomyia destructor.

Head black, opaque, sometimes brassy, granulated over its entire surface; *eyes* not prominent, rounded in compliance with the curve of the head, and with the stemmata, red-brown; *antennæ* pale brown, furnished with short cinereous hairs, the two basal joints pale yellowish; the terminal ones in the male, a little dilated and approximated so as to form an obvious ovate, acute mass. *Thorax* with the granulæ equal to those of the head; black, usually brassy before the line of the base of the wings; nerve of the wings pale brownish; *feet* whitish with black apophysis. *Abdomen* ovate-acute, perfectly black, highly polished and furnished with a few short hairs; the segments of the base are sometimes pale yellowish or testaceous.

Length one-tenth of an inch.

This is often mistaken for the Hessian fly, in consequence of being found in wheat fields in vast numbers during the devastation committed there by that insect, and many have been deceived by the specious circumstance of its evolution from the pupa itself of the destroying larva, under their own observation. But the truth is the Ceraphron belongs to that vast tribe of insects included by Linne under the Genus Ichneumon. True to the manners of its kind the parent deposits her eggs within the bodies of the larvæ of the Cecidomyia destructor, through a puncture made by her acute oviduct for the purpose; the young when disclosed from the egg, feeding securely within the body of the larva, at length kills it, but not in general until after its change into the pupa state. Protected by this indurated covering, the parasite undergoes its change, and appears in the perfect state, about the latter part of June. It seems probable that this insect prevents the total loss of our wheat crops, by restraining the increase of the Cecidomyia, within certain bounds. The *Ichneumon Tipulae* of Mr. Kirby is congeneric with this, but is doubtless specifically distinct.

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VOL. I.

*On a New Genus of the Crustacea, and the Species on
which it is established. By Thomas Say. Read
July, 8, 1817.*

ORDER MACROURI.

Genus CERAPUS*,

Essential Character.—Thumb of the second pair of feet biarticulate; Interior antennæ four jointed, exterior ones five jointed.

Artificial Character.—Antennæ subequal, interior ones 4-jointed, exterior one 5-jointed. Two anterior pairs of feet monodactyle, the second pair with a two jointed thumb.

Natural Character.—Body semicylindrical, somewhat linear, decreasing towards the tail, ten-jointed. Head distinct from the first joint and larger, quadrate, a little elongated into an angle near the base of the interior antennæ, each side, for the reception of the eyes, which are hardly prominent. Antennæ nearly equal, very large, interior ones with the first joint thicker, second and third

* From *κέρας*, a horn, and *πόντος*, a foot, in allusion to the animal employing its antennæ as feet.

nearly equal; exterior antennæ five-jointed, the first joint placed in a deep sinus beneath the eye, short, not projecting beyond the margin of the head above, second joint hardly longer than the first, third and fourth equal to the second and third of the interior antennæ. Anterior pair of feet moderate, with a small ovate hand and moveable nail, not closing on the hand, attached to the first segment of the body; second pair with the basal joint attached to the edge of the body (as in *Cymothoa*, &c.) second joint broad, compressed with an insisure near the base before, third small, medioliform, carpus cylindrical, narrower than the preceding joint; hand very large, compressed, subtriangular, attached to the carpus by the inferior edge of the acute angle, which is a little curved, tip emarginate and armed with a strong, acute spine on the anterior angle, thumb two-jointed, first joint incurved, linear, second acute, closing on the spine of the hand. Third and fourth pairs of feet equal, similar to each other, first joint dilated, equal to that of the preceding feet, remaining joints small, nearly equal to each other, submoniliform; two posterior pairs of feet reflected above the back; tail incurved, furnished each side near the tip with a pedunculated bifid process, and a minute, conic, acute, papilla.

1. *C. tubularis*. Head with a mucronate carina before; eyes oval, black. Hand and first joint of the thumb of the second pair of feet with one or two obtuse teeth within. Body above blackish, with irregular paler spots; antennæ and feet white, joints tipped with blackish; two hind pairs of feet and tail white.

Inhabits a tube. Length about one quarter of an inch.

This curious animal, for which I have constructed a

new genus, was found amongst fuci on the sea beach at Egg-Harbour in considerable numbers. In its mode of life it bears some resemblance to the *Pagurii*, inhabiting a cylindrical tube; but the circumstance of its inhabiting a foreign body is the only point of similarity between them. To the genus *Caprella* it approximates by the form and disposition of the head with the antennæ; but differs from it in essential particulars, as in the form of the tail, number of joints of the body, and position and form of the feet. With the genera *Talitrus*, *Gammarus*, &c. it is related chiefly by the incurved tail and reflected hind feet, but the caudal appendices, as well as many other important parts, are totally dissimilar, these appendices are not rigid and spinose as in *Gammarus*, but flexible and lateral as in *Cymothoa*. Its proper situation in the system of Latreille will be with the family *Gammarinæ* and intermediate between the genera *Gammarus* and *Caprella*. But in the excellent modifications of Dr. Leach it will be placed in his family *Podoceridæ*, next to his recently discovered genus *Jassa*, to which indeed it might be referred, as far as I am able to judge from the brief description that has been given of that genus, but for the two-jointed thumb, and other minor characters.

This little animal is very active, running with great facility amongst the branches of *fucus*, *sertularia*, &c. although encumbered by its tube, and what is extraordinary, making use of its four antennæ only as feet; the proper feet are all included within the tube, with the exception of the two anterior pairs, which are only used to seize its prey and convey it to the mouth. Feeds principally upon the animals of *Sertularia*?

The tube is always proportioned to the size of the

inhabitant, and appears to invest it closely, nevertheless when an impediment is presented, in consequence of which the animal is prevented from proceeding onwards, he turns his body immediately, and apparently without any difficulty within the tube, protrudes his head from the opposite extremity, and thus makes use of either end indifferently as the anterior part.

When swimming about one half of the body is projected from the tube, and is suddenly and repeatedly inflected, so as to proceed forwards by jerks. It very much resembles, at first view, the larvæ of insects of the family of Phryganides, for which it must have been hitherto mistaken.

Not having the tube before me, I can only say from recollection, that it is cylindric, membranaceous, diaphanous, open at each end, and of a colour somewhat reddish; but of its origin I know nothing, a little observation on the spot might however determine this. To suppose it fabricated by the animal, would be supposing an absolute anomaly in the history of the whole race of crabs, and there is no organ belonging to the Cerapus which could be adapted to a function so remarkable. I think it probable the tube will be ascertained, by further and more particular examination, to have been constructed by one of the annelides; indeed it perfectly resembles in every respect a section of the tube of that species of Tubularia which we so commonly find in the cavities of the large Alcyonium of our coast.

A plate of this animal, with the necessary details, will be given in the succeeding number.

An Account of an American Species of the Genus Tantalus or Ibis. By George Ord. Read July 8, 1817.

MEXICAN IBIS,

TANTALUS MEXICANUS?

Mexican Ibis, LATH. Gen. 3, part I, p. 108.—
Tantalus Mexicanus, idem, Ind. Orn. p. 704. LINN.
GMEL. 1, p. 652. *L'Acalot*, BUFF. SONNINI, tome
58, p. 267.

On the 7th May, of the present year, Mr. Thomas Say received from Mr. Oram, of Great Egg-harbour, a fine specimen of *Tantalus*, which had been shot there. It is the first instance which has come to my knowledge of this species having been found in the United States. I was since informed that a recent specimen of this bird was, likewise in the month of May, presented to the Baltimore Museum; and that two individuals were killed in the District of Columbia.

So large and so beautiful a bird as the present is, has, certainly, not escaped the eye of the naturalists of Europe, especially those who have travelled in the southern parts of our continent, where, doubtless, this species is indigenous; and yet in turning over the pages of the most celebrated works on ornithology, I can find no description which corresponds to the subject before us, so as to leave no doubt on the mind of the examiner as to the species referred to.

The descriptions of the Glossy Ibis, the Green Ibis, and the Bay Ibis, by the late George Montagu of England, in his excellent Ornithological Dictionary, all of which birds he considers as constituting only one species, form

a whole which should seem to authorize us to class the present under his adopted trivial denomination, *igneus*; but not one of the most celebrated authors represent America as the habitat of the Glossy Ibis.

From Dr. Latham's account of the *Tantalus Mexicanus*, I have conjectured that this species is the same; notwithstanding, I must confess that there is somewhat in his description of the Brazilian Whimbrel, *Numenius Guarauna*, which likewise approximates to the present. In this place a remark of Montagu is not unworthy of note. "The *Tantalus* genus," says this intelligent naturalist, "has a long hind toe affixed to the heel; a complete continuation of the foot for bearing on the ground its whole length, in order to support the body." This distinction between the *Numenius* and *Tantalus* genera, though omitted in the generic characters, is of importance, inasmuch as errors have arisen in the classification of these birds, when the bare space between the bill and eyes was so small as to occasion its being overlooked. The hind toe of Curlews has its origin above the heel of the foot. This distinction obtains, I believe, as far as our discoveries extend. Although Brisson makes the *T. igneus* a *Numenius*, yet I can hardly suppose that the acute Latham, if he described autoptically, would have committed a like error with respect to his Brazilian Whimbrel. The characters of the bird under review are sufficiently strong to preclude doubt as to the genus to which it belongs, although its face is not so naked as is that of the Scarlet Ibis.

In the following description I have aimed at perspicuous detail, in order that those ornithologists who have access to specimens of the *Tantali* mentioned above

may be incited to re-examine the subject. I may be in error in supposing our bird to be the *Mexicanus* of the nomenclators; but as I cannot make a comparative examination of individuals themselves, Latham's description approaches too near the present subject to allow me to refer it to any other species than that chosen.

Length from the tip of the bill to the end of the tail, thirty-one inches, breadth thirty-nine inches; bill to the angle of the mouth five inches and a quarter, not quite so much deflected as is that of the Scarlet Ibis, of a lead colour, changing to green olive after death, the edges of the mandibles bending inwards; from the nostrils, which are linear, a furrow runs to the extremity of the upper mandible, which projects beyond the lower upwards of one tenth of an inch; the lower mandible is canaliculated below to the end, and there is an obsolete furrow on the top of the upper mandible near the tip; the bill is six tenths of an inch thick at the base, measured horizontally, and seven tenths of an inch thick vertically; the tongue is sagittate, and eleven sixteenths of an inch from its tip to the acute point of its lateral lobe; the jugular pouch is dusky; the bare skin on the forehead is a trifle more than one tenth of an inch in breadth, it thence extends round to the posterior angle of the eyes, and descends to the jugular pouch along the base of the lower mandible, this skin is white; the eye lids and lores dusky; eyes dark; the hind head, neck, upper part of the back, upper scapulars, shoulders of wings, whole lower parts and thighs bright brownish red, that of the upper scapulars and interscapular region is vivid and shining, being dashed with vinaceous; head changeable purple; throat below the naked pouch dusky, freckled with red, and with green reflections; the back,

rump, wings above and below, tail, its upper and under coverts, with the vent, are of resplendent colours, composed of purple, bronze and golden green, the purple predominating on the scapulars and tail; spurious wing and primaries golden green, the latter reach to the end of the tail, which is nearly even, or, when closed, subcuneiform, and composed of fourteen feathers; the plumage of the head and neck separates in the manner of that of the domestic goose, presenting an obliquely striated appearance; legs from the body to the end of the middle toe nail thirteen inches; length of leg from the insertion of the toes to the knee nearly four inches; length of middle toe to the end of the nail three inches, of the back toe one inch and a half; the legs are bare for two inches and three quarters above the knee, and with the feet are of a lead colour, changing to dusky after death; the outer toe is connected to the middle one, as far as the first joint, by a deeply scollop ed web, that which connects the inner toe is not so large; the middle claw is slightly curved outwards, and is dilated on the inner side to a thin edge, which is irregularly pectinated; the claws truncate, and of a dark horn colour; bottom of feet lined with a thick granulated membrane.

The above is a splendid bird, and is a considerable acquisition to the Ornithological Synopsis of the United States. Whether or no it migrates to the north in the vernal, or breeding, season, as the European *igneus* is said to do, I cannot determine. The other American species of this genus, whose histories have been elucidated, are known to breed in the southern parts of our continent, where they are constant residents, and where there are extensive tracts of low marshy lands, productive of

the food of which they are fond, and which afford them a safe retreat during the periods of incubation and nutrition. Our specimen was considered a curiosity at Egg-harbour, and was unknown there even by name. I have often been on the coast of New Jersey, in the spring and autumn, and was equally unacquainted with this bird.

The sex of this specimen could not be ascertained, as its intestines had been removed before it was forwarded to Philadelphia, and the sexual parts were obliterated.

An Account of the Crustacea of the United States. By Thomas Say. Read Aug. 5, 1817.

The consequence of the discovery of a new genus in this interesting class of the inhabitants of our coasts, has been the revisal of my manuscript descriptions of the Crustacea, and adetermination to publish them without further delay, in waiting for more considerable accessions of species. And although the list included in the following paper is not considerable, it may nevertheless form the commencement of a complete account of our crustaceous animals—a very imperfect one it is true, but it may be considered of some importance, in as much as the errors which may be discovered in it, will, by being corrected by competent naturalists, introduce us to a more perfect knowledge of these curious depurators of the ocean.

ORDER BRACHYURA.

Genus CANCER.

Thorax convergent behind. The second joint of the internal peduncle of the external pedipalpi quadrangular,

notched at the apex internally, for the reception of the following joint: all the feet formed for walking.

SPECIES.

I. C. *Panope*. Thorax with about three serrate teeth each side, clypeus porrect, truncate, with a deep fissure, anterior feet glabrous, carpus with a thick spine, hands large, subunequal, fingers black.

Cancer Panope? Rees's Cyclop.

Inhabits oyster beds, &c. common.

Plate 4. fig. 3.

Thorax laterally, and on the edge, granulated; three lateral, serrate teeth, and a more or less definite obtuse one, near the posterior canthus of the eye; superior eyelid with two fissures, and a tooth or prominent angle each side, inferior lid ciliate within and with a more prominent tooth near the middle, middle as in the upper lid occupied by a sinus; anterior feet minutely granulated, hands rounded above and beneath, finger perceptibly deflected, and with the thumb strongly toothed within, and black-brown, with impressed striæ; terminal joint of the abdomen not abruptly straitened, rounded at tip; the interior antennæ are comose instead of the larger terminal articulated seta.

Length one inch and one tenth, breadth one inch and a half.

The young of this species are often found on oysters, (*O. virginica*) in our markets, secreting themselves about the hinge of such as are not perfectly divested of the mud in which they had been imbedded. They differ a little in appearance in the different stages of their growth; when very young the cleft in the middle of the clypeus is hardly perceptible, but it gradually deepens with age,

the anterior obtuse tooth also does not exist in the young, but is gradually separated by a sinus from the elevated external angle of the eye as the animal increases in size.

2. *C. irroratus*. Thorax with nine crenate teeth on each side; Clypeus three-toothed; hands with four or five elevated lines on the external side.

Cancer undecemdentatus? Latr. Hist. Crust. et Ins.
Inhabits the ocean. Common.

Plate 4. fig. 2.

Thorax whitish, with crowded small red granules, a whitish dorsal mark behind the middle resembling the letter H; on each side, two parallel curved lines of white dots, nine or ten in each, sometimes obsolete in the old shell; a few hardly raised obtuse tubercles on the disk; posterior marginal tooth more acute, but hardly more prominent than the others, with an indentation at its base on the hind edge of the thorax; central tooth of the rostrum depressed rather below the line of the two others; Orbita orbicular, two fissures or impressed lines above and two beneath, a little raised into two teeth on each side of the exterior antennæ and into one tooth at the posterior canthus; Thighs ciliate above, and marked by an impressed band near the tips, both joints of the tibia ciliate beneath, tarsi compressed, acute and deeply striate.

Carpus above spotted like the thorax, with an advanced acute spine at the inner anterior angle. Hands moderate,

* Mr. Savigny in his ingenious work on the organs of the mouth of Insects and Crustacea, has shown that crabs, &c., have in reality sixteen feet; but that six of them are palpiform and applied to the mouth. I have, however, continued to make use of the old terms, carpus, hand, finger, thumb, &c., until the terminology is settled.

equal, with four or five elevated, granulated lines on the outer side, two of which are continued upon the finger, finger somewhat deflexed and with the thumb brown or black at tip, and furnished with regular crenate teeth; terminal abdominal segment triangular, acute at tip.

Length one inch and a half, breadth two inches and three tenths.

The female differs from the male in some respects so particularly that it would be easy to mistake her for a distinct species; to prevent this confusion it is proper in this place to point out the differences. The thorax of the female in two specimens before me is destitute of the white H mark and also of the curved lines of white dots; but the most striking dissimilarity is in the form of the lateral teeth of the thorax, these are exactly of the same number as in the other sex, but the form is different, each one being divided at tip into several smaller tuberculous teeth; the abdomen is but little dilated, it is also hairy; the fingers are rather shorter and more of a deep black than are those of the male. Whether or not it would be correct to refer this species to *C. undecimdentatus* of Fab. and Latr. is not to be positively determined from the very concise description of that crab given by the latter author, but certain it is, it approaches nearer to it than any other with which I am acquainted, but differs from it, as far as I can judge from the description, in not having the "thorax rather dilated behind," neither are the "handclaws somewhat hairy."

The exuvia of this species is often found on the sea beach cast up by the waves. I have not seen the crabs in bays or inlets, they appear to delight in deep water, and

are eaten by the Blackfish, and Sea-basse, being often found entire in their stomachs.

3. *C. granulatus*. Thorax granulate, with five lateral teeth, clypeus with three very obtuse ones.

Inhabits bays and inlets near the sea.

Body and feet spotted with brown and covered with minute, crowded granules, those of the thorax more conspicuous, distant and tuberculiform; spots of the feet and abdomen impressed and placed in more or less obvious lines. Thorax a little uneven, edge all round and teeth granulated; teeth rather large, serrate, hind one a little smaller, anterior ones forming the canthus of the eye. Orbit subovate, a fissure above, an obtuse tooth beneath the anterior canthus, and a fissure beneath the hind one; Clypeus somewhat advanced, with three obtuse, subequal teeth, middle one smaller; Sides of the thorax beneath, furnished with silky hair; Anterior pair of feet with the second and third joint ciliate before, the latter concave above, not longer than the edge of the thorax, with a very obtuse tooth at tip and impressed transverse line; Carpus acutely spined within, no spine on the opposite edge; Hand convex on the back, an elevated line above on the inner side, fingers striate with impressed lines, about four on the thumb, not falcate at tip.

Length about one inch and a half, greatest breadth at the hind teeth near two inches.

The specimen described was a female, for which I am indebted to Mr. Titian Peale. In the form of the body, number of the lateral teeth, &c., it has a great resemblance to *Portunus pictus*. I have to regret the loss of this individual before a drawing was made of it.

Neither of the three species of Cancer which we have here described are sought after as food.

Genus PORTUNUS.

Terminal joint of the hind feet formed for swimming. Peduncles of the eyes short, not reaching the anterior angles of the shell. Thorax transverse with five (rarely six) teeth on each side.

SPECIES.

1. *P. pictus.* Thorax with five prominent, acute teeth, each side; Clypeus one-toothed; Carpus two-spined and one on the anterior angle of the hand above; terminal joint of the hind feet rounded at tip.

Inhabits sandy shores of the sea. Common.

Plate 4. fig. 4. ¹⁰ ₁₀

Thorax with minute granulae, white, with very numerous red points; four lateral, equal, acute, spiniform teeth, and a similar equidistant one at the hind angle of the orbit of the eye; Orbit oval, with a strong, advanced tooth on the inferior edge, and a perceptible fissure or impressed line above; second joint of the peduncle of the external pedipalpi deeply emarginate at the inner tip; tooth of the clypeus longer than those of the interior canthus of the eyes, which are also prominent; Thighs silvered above near the tips, second joint of the tibia with an impressed line each side, tarsi compressed, with two impressed lines behind, and one before, posterior ones oval, rounded at tip; Carpus silvery above and spotted with red, two-spined, the inner spine larger and very acute, external one flattened above; Hands equal, almost linear, above silvery, spotted with red, outer edge prominent, and with the inner one granulate, an acute spine at the inner anterior angle, thumb silvered above, edges prominent, and with the finger somewhat linear, hooked at tip, and furnished with irregular teeth; penul-

timate joint of the abdomen deeply emarginate at tip, for the reception of the terminal, pentagonal, small one.

Length one inch and a fifth, breadth one inch and two fifths.

The exuvia of this beautiful species is extremely common on the sea beach. It is known to the inhabitants by the name of *Sand Crab*, and is not used for food. It seems to be closely allied to *P. depurator* and *lividus* of the European seas. The clypeus, strictly speaking, is not three-toothed, those which appear to be lateral teeth are in reality the anterior angles of the orbits of the eyes, elevated. This species does not perfectly agree in all its characters with the genus Portunus as defined by Doctor Leach; this very acute naturalist says, that in this genus there are two fissures in the hind margin of the orbits of the eye, whereas in the species here described there is but one; yet there is no doubt but the situation we have here assigned to it is perfectly correct; the fissures may perhaps serve as good characters by which to separate the genus into smaller divisions.

(To be continued.)

We are indebted to the friendship of Mr. C. A. Le-Sueur for the plate of the *Cecidomyia destructor* (Hessian-fly) with its parasite, which accompanies the present number.

I forgot to mention in its proper place that the parasitic insect, *Ceraphon destructor*, which is so commonly mistaken for the *Cecidomyia*, after the business of propagation is performed, throws off its wings as a useless incumbrance, in this respect resembling some species of the ge-

nera Formica, Termes, &c., to which also it bears some resemblance in point of form and appearance; this has led many to suppose that the Hessian-fly is in reality no other than a species of pißmire in the apterous state. *T. Say.*

Explanation of the Plate.

Plate 3. Fig. 1. *Cecidomyia destructor* at rest, natural size.

Fig. 2. Do. with the wings extended, natural size.

Fig. 1. *b.* Do. Female magnified.

Fig. 2. *a.* Do. Male do.

Fig. 3. Antennæ. *a.* Antenna of the male. *b.* Antenna of the female. Both magnified.

Fig. 5. A plant of wheat with the culms cut off near the root; the vaginæ of the leaves of two of them are stripped down to show the situation of the pupa and larvæ just above the root. *a. a.* Larvæ and Pupa, the three central stalks are represented as punctured by the Ceraphron to deposit her eggs in the larva within.

Fig. 6. A section of the culm with two of these insects in the pupa, or, as it is usually termed, flax-seed state, magnified.

Fig. 7. The Ceraphron *destructor* at rest, natural size.

Fig. 8. The same flying.

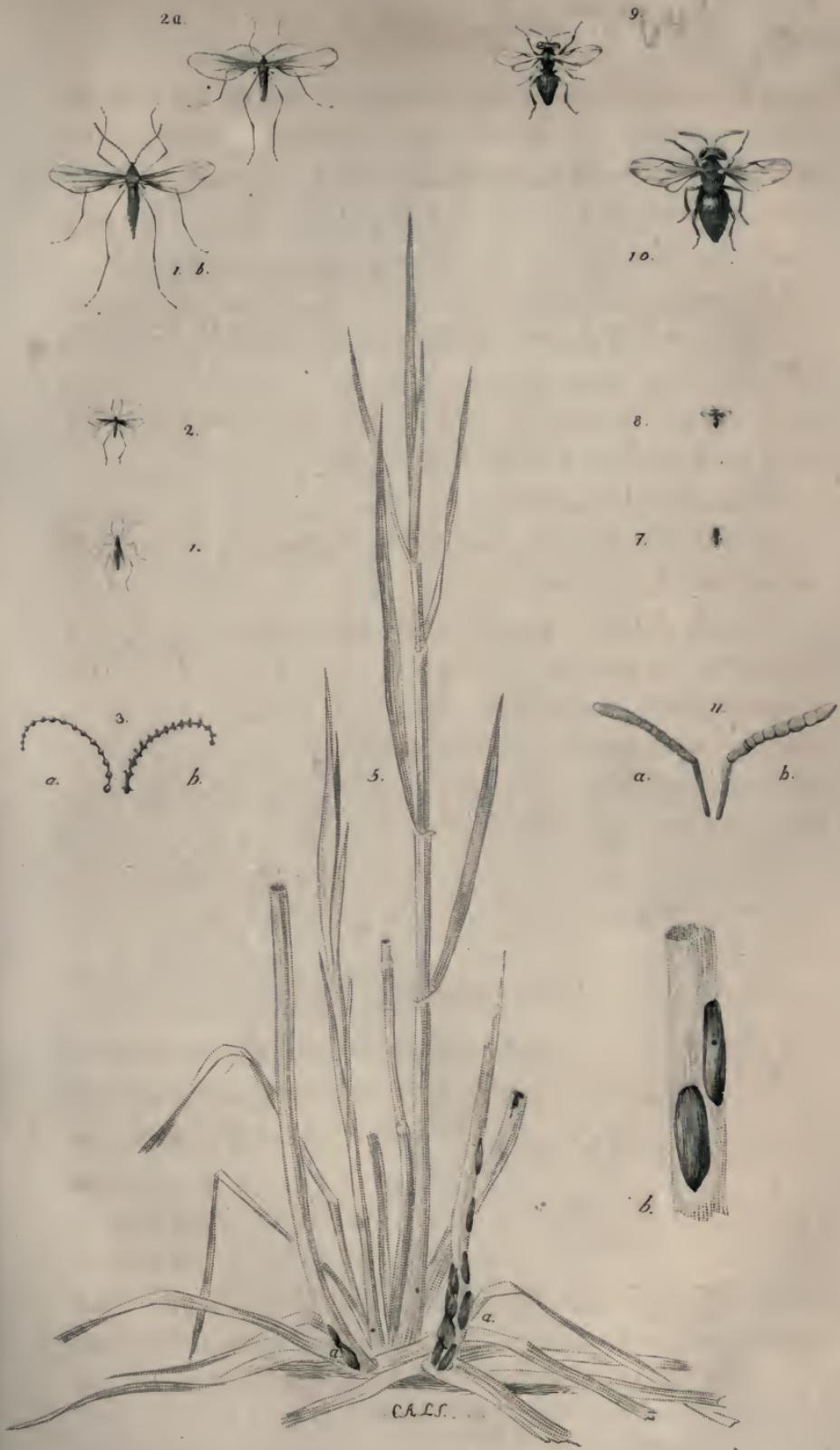
Fig. 9. Male do. magnified.

Fig. 10. Female do. do.

Fig. 11. Antennæ. *a.* that of the male, *b.* that of the female, both magnified.

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Arrived at 10. 11. 1770. by railroads.

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SEPTEMBER, 1817.

VOL. I.

An Account of the Crustacea of the United States. By Thomas Say. Read Aug. 5, 1817.

(Continued.)

Genus LUPA. Leach.

Terminal joints of the posterior feet formed for swimming. Anterior feet equal, arms spinous before; Peduncles of the eyes short, thick; Orbit above with two fissures, beneath at the outer angle with one. Fourth segment of the abdomen of the male elongated, narrower than the preceding. Thorax transverse, nine toothed on each side, the posterior tooth largest.

SPECIES.

1. *L. hastata.* Thorax equal, with distant granulae; clypeus three-toothed; arms three-spined; carpus unarmed.

Inhabits bays, &c. Very numerous.

Granules of the thorax scattered unequally, obsolete behind, arranged in four lines, two dorsal, and one on each side at the elongated tooth; Clypeus with two equal teeth, and a smaller, but equally prominent conic one connected with the labrum, between the interior antennæ; anterior feet with the third joint three-spined before and one spined at the outer tip; carpus with two elevated lines, the outer one sometimes extended into an obtuse spine; hands somewhat linear, with five or six raised, granulate lines, and a strong spine at base, fingers linear, a little hooked at tip, with impressed lines, and furnished with somewhat regular teeth, about four in each, teeth rounded, compressed, each with a supplemental smaller one at the base each side; fourth joint of the three following pairs of feet, with two short spines at the tip above.

The edible crab is known to every one by the name of "Crab." It is brought to our markets in great quantities, from all the bays and inlets of the sea coast, and is a very acceptable food. Feeds on dead animal matter in its various stages of putrescence, and is one of the many depurators of the ocean. In addition to the particulars already stated by naturalists of its manners, I will observe that it often buries itself in the sand so that no part is visible but the eyes and interior antennæ, these last are then in continual motion, the bifid terminal joint acting as forceps to seize and convey to its mouth the small molluscous animals for food. They are so numerous that the sein fishermen often reject them. The shell is cast annually, generally in the spring, and they are then known by the name of soft-shell crab, are very delicate, and in particular request for the table: in this state the crab is incapable of any defence against its enemies; the male usually re-

tires to a secluded situation for security, but the adult female is protected by a male, whose shell is hard, they are then called *double crabs*. It is sometimes infested by a small worm resembling an *Ascaris*, in considerable numbers; these have occurred to the number of two between each of the lappellæ of the branchia. I have seen them confined to the branchia of the left side only, those of the opposite side were perfectly free in one instance. Worm short, filiform, a little attenuated and flattened before, pale yellowish, extremities rounded, body silvery above and spotted with red.

Genus PINNOTHERES.

Exterior antennæ short, the three basal joints longer, terminal one setaceous, arising from under the interior canthus of the eye; peduncles of the eyes very short, dilated, spherical. Interior antennæ larger, arising from a hemispherical base, and placed beneath the clypeus. External pedi-palpi with the outer division concealed, internal division with the peduncle of one subincurved joint, rounded at tip and incumbent on the mentum, terminal joint bifid, intermediate one subcylindrical, attached behind the external tip of the peduncle. Feet formed for walking.

SPECIES.

1. *P. Ostreum*. Thorax rounded before and on each side, somewhat truncate behind, clypeus a little advanced, entire; hand gibbous above near the base of the thumb.

Inhabits the common oyster (*O. Virginica*.)

Plate 4. fig. 5.

Thorax with minute distant hairs, punctured, punc-

tures minute, distant, an impressed, abbreviated, transverse line near the middle; Clypeus sometimes perceptibly emarginate at tip; Sides of the thorax rounded, without a margin or edge; Orbita rounded, eyes composed of minute, red, approximate, punctures; hands clothed with short white hairs, abruptly gibbous above the origin of the thumb; fingers hairy, rectilinear, shorter than the hand, toothed at the base within, and terminated by an abrupt, short, acute hook; penultimate joint of the first pair of feet a little dilated. Abdomen as large as the thorax.

Length seven twentieths of an inch, breadth two fifths of an inch.

A very common inmate of the oyster of our markets, and of more frequent occurrence in that variety called *Fresh Oyster*. Though small, it is excellent food, and those who eat oysters seldom reject it. Where the fresh oyster is opened in considerable numbers, the crabs are often collected and served apart, for the palates of the luxurious. It is a curious fact, that although the female of this species is so very often found occupying the Oyster, the male is absolutely unknown. This is supposed, by those who are not conversant with natural history, to be the young of the common Crab (*Lupa hastata*.)

2. *P. depressum*. Thorax flat, rounded, somewhat truncate behind, edged on each side by a raised line; clypeus advanced, truncate; penultimate joint of the feet dilated; eyes conspicuous.

Inhabits the common Oyster?

Thorax flat, polished, with a marginal raised line of very short dense hair, which is broader behind, straitened over the eyes and almost extinct on the clypeus; eyes pro-

portionably larger and more prominent than in the preceding species; Carpus with a line a little elevated on the upper side within; hands suboval, an elevated, obtuse line on the exterior upper side; fingers short; penultimate joint of all the feet dilated, compressed, with minute crenae on the inner edge; tarsi incurved at tip, very acute; Abdomen gradually attenuated, joints transverse, terminal one much smaller than the preceding, rounded.

Length not quite one tenth of an inch, breadth a little more than one tenth.

This description is taken from a male specimen in my cabinet, procured at Egg Harbour several years ago; having taken no note at the time I cannot state decidedly in what shell it was found. It is possible it may prove to be the male of the preceding species.

Genus OCYPODE. Latr.

Peduncles of the eyes elongated, inserted into a central and anterior projection of the thorax, and extending in a groove along the front to the lateral angle; Shell rhomboidal or cordate; feet formed for walking.

SPECIES.

1. *O. arenarius.* Thorax transverse, quadrate, finely granulated, edges minutely crenate. Anterior margin sinuate; hands compressed, serrate; feet very hairy.

Cancer arenarius. Catesby, vol. 2. tab. 35.

Ocypode albicans? Latr. Hist. des Crust. et Ins. from Bosc.

Inhabits sandy beaches of the sea, in holes of considerable depth.

Thorax entirely covered with granulæ, edge with small crenate teeth, which are obsolete on the base and near the clypeus; about one sixth part of the front elongated, rounded at tip, inflected and adpressed to the face, remaining portion of the front sinuated, anterior angles sallient, acute, lower eye-brow with larger crenate teeth, and on the cheeks each side of the mouth the granulæ resemble short obtuse spines, a curved line arises from a fissure in the middle of the lower eye-lid and terminates at the inferior inner angle; feet compressed, very hairy, surface smooth, sometimes granulate in the females; thighs margined above, the posterior ones with a marginal line beneath also, last joint with an impressed longitudinal line each side, tarsi acute, striate with elevated lines; Anterior feet beneath glabrous, on each side dentate, above somewhat rugose; wrist scabrous, with a spine on the inner angle; hands suboval, compressed, scabrous, above dentate, and on the edge beneath serrate, fingers nearly as long as the hand, with elevated lines; last segment of the abdomen and tail in the male longer than broad.

Breadth of thorax one inch and two-fifths.

This species excavates holes for its dwelling of the depth of three or four feet in the sand of the sea beach, just above the influence of the surf, whence it makes occasional sorties, principally at night, in pursuit of food; runs with considerable swiftness when surprised or dug out of its hole, holding up its arms in a menacing attitude.

The latter end of October or early in November, according to the state of the weather, they leave their residence near the water, and retire a distance from it, where they may hibernate in security; having found a suitable situation, they form a hole of similar appearance to that

which they have just left, and having closed up the entrance, so that it is undistinguishable from the general surface, they retire to the bottom to pass the winter in a state of inactivity.

This species is figured by Catesby in such a manner as to leave no doubt as to its identity with the individual here described. In the West Indies, whence his specimen was obtained, this Ocypode arrives at a size rather more considerable than in this country, but in no other respect, that I know of, does it differ. The species described by Mr. Latreille from Mr. Bosc's work, under the name of *albicans*, seems to agree in some measure with this, but as he does not refer to Catesby's figure, I am not prepared to say it is the same; this uncertainty has induced me to insert the description in this place, notwithstanding the certainty of its having been noticed before.

2. *O. pugilator*. Thorax transverse quadrate, glabrous, a little straitened behind; one of the hands in the male very small, the other very large.

Ocypode pugilator? Latreille, Hist. Crust. et Ins.

Inhabits bay shores and salt marshes.

Thorax, when closely examined, covered with minute granulæ; about one third of the front elongated, deflected and rounded at tip, remaining anterior margin rectilinear, the angles not sallient but acute, and without sinus behind on the lateral edge; lower eye-lids regularly dentate; cheeks scabrous; feet almost naked (there are however a few scattering hairs,) somewhat scabrous or rugose; one of the hands remarkably large, longer than the feet, a little granulate, equal above and beneath, fingers nearly straight, with very small tuberculate teeth, thumb distant from

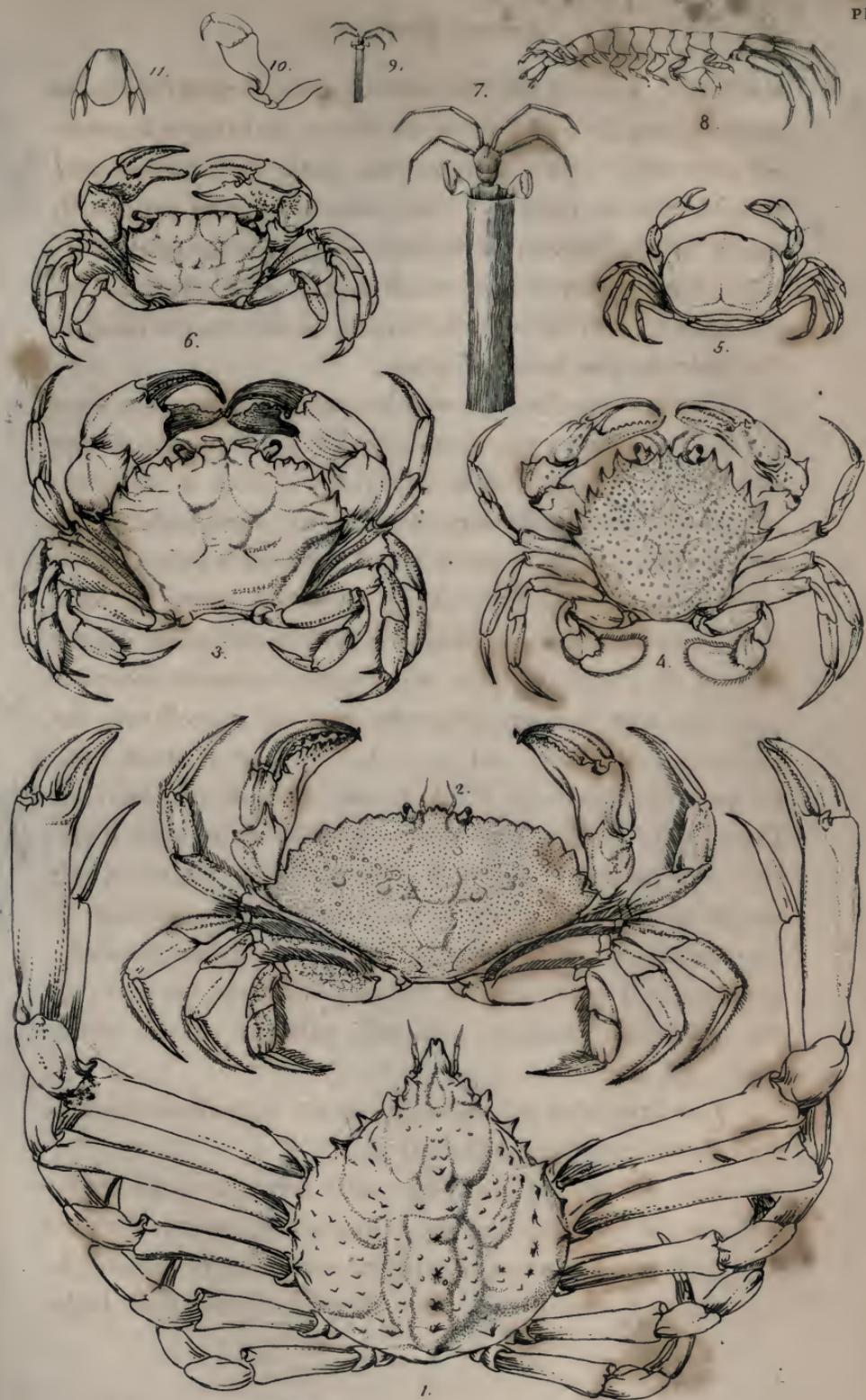
the finger, forming an oval interval, curved near the tip, so as to extend over the tip of the finger, and like it furnished with very small and numerous teeth, both smooth and polished on the inner side; the other hand very small with nearly equal fingers; abdominal segments broader than long; hands of the female small, equal, a little bearded on the inner side of the tip; the fingers of the smaller hand of the male are also bearded at tip.

This is the animal so well known to the inhabitants of the sea coast under the name of "Fiddler," an appellation almost universal, and probably derived from a supposed similitude between the large hand of the male and the fiddle or violin. I have never heard them utter any cry.

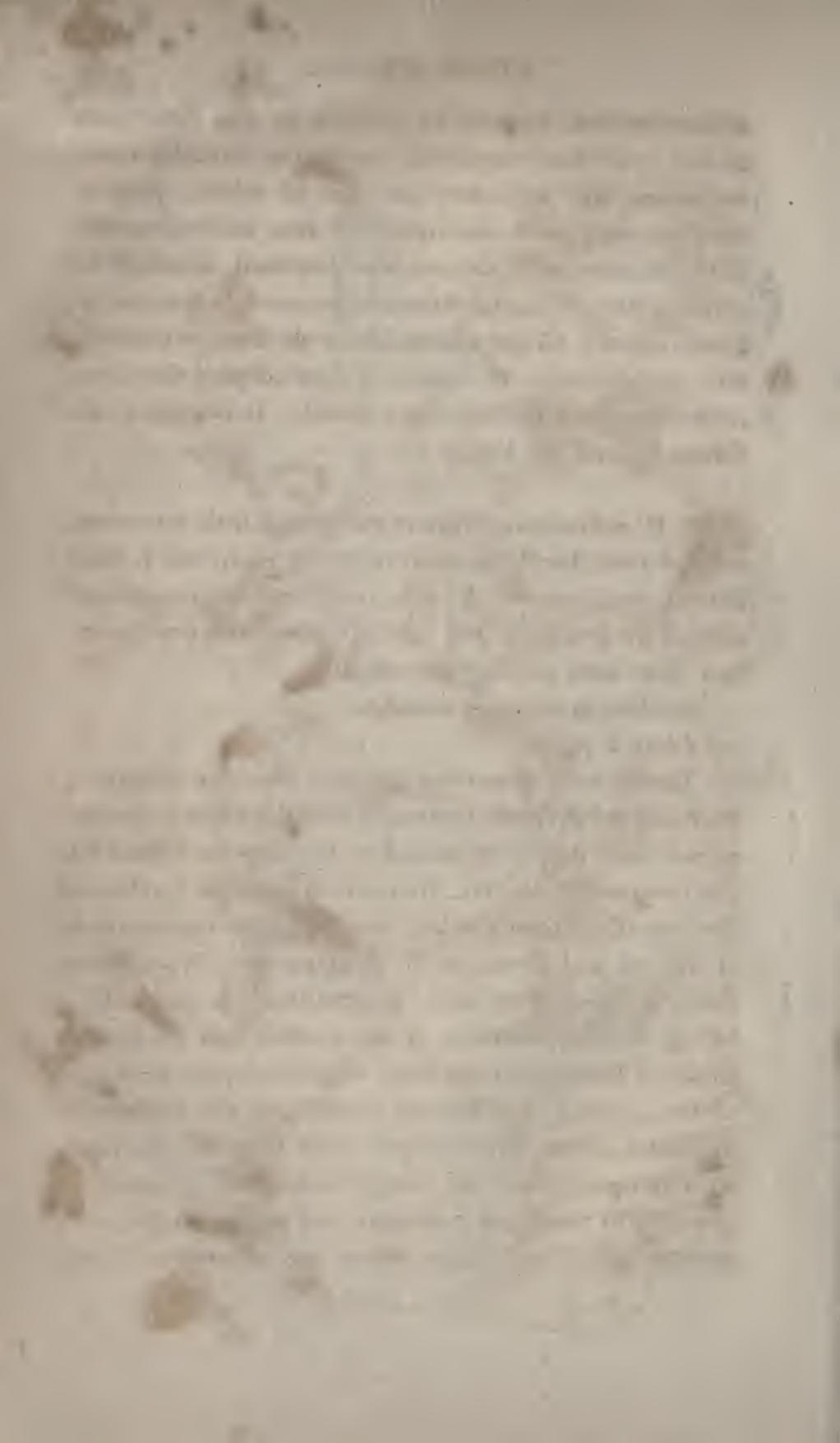
The pugilator digs a hole in the earth, where the sand is not too abundant, choosing usually a situation on the margin of a bay, or other salt water, in which the earth possesses some tenacity, that the walls of its cell may be the more permanent, and not liable to cave in upon him. In such situations the Fiddlers are extremely numerous. During the day they seldom venture far from their dwelling, but upon the slightest appearance of danger whole troops of them disappear immediately, taking refuge in their holes, sometimes when the danger is imminent an individual will seek security in a dwelling not his own; in this case the occupant patiently submits to the intrusion.

The large claw is sometimes on the left side and sometimes on the right, indifferently.

The species *vocans* of Linnæus seems to have included several perfectly distinct animals, and great is the confusion in the synonyma of different authors in relation to it. Mr. Latreille has been able to distinguish three



C. A. S. Scudder D. & Scudder



distinct species, referred by authors to this one; these he has accordingly separated under the names *vocans*, *maracoani* and *pugilator*, the last of which, judging from the very short description of that author, appears to be the same with the one here described, although he gives, as its habitat, the American ocean. In manuscript I had named it *Citharoedicus*, but averse from an unnecessary multiplication of names, I have adopted the above, notwithstanding the objection stated. It belongs to the Genus *Uca* of Dr. Leach.

3. *O. reticulatus*. Thorax quadrate, a little transverse, with oblique, hardly elevated rugæ on each side behind; hands rather large, equal, ovate, punctured, fingers smooth; tibia of the four hind feet, thickly clothed with fine incumbent hair; body laterally reticulated.

Inhabits muddy salt marshes.

Plate 4. fig. 6.

Thorax with numerous, minute, irregular punctures, an impressed pyriform line on the middle, which is narrowed and more deeply impressed on the clypeus, behind this is a transversely oval one, from which proceeds two lines to the base of the thorax, a line arises from the interior orbits of the eye and curves to the pyriform one; clypeus truncated, with an abbreviated, longitudinal line each side; a lateral obtuse sinus more or less distinct near the anterior angles of the thorax each side, anterior angles acute; tip of the clypeus and labrum granulated, the granules of the latter much larger; cheeks and sides of the body, with numerous, parallel, longitudinal lines of granules, granules in pairs and surmounted at regular distances by perpendicular, equal hairs, which are inflected and hori-

zontal before their tips, with the most perfect regularity, giving to the whole surface a reticulated appearance; beneath the lateral edge of the thorax are about six short ciliate curves, disposed in a longitudinal series; no elevated lateral line; feet rather short: thighs mucronate above near the tip, with minute aculeæ behind, which are wanting on the posterior ones; tibia clothed with fine, dense, incumbent hairs; tarsi short, acute, striate with six ciliated lines; anterior feet rather large, thick, scabrous with minute abbreviated, moniliform lines; carpus unarmed, hands rounded beneath, with a moniliform edge above, which becomes almost serrate on the thumb; second peduncular joint of the external pedipalpi, with a strong, elevated line on the inner margin.

Inhabits the banks of creeks, &c. in salt marshes, where it digs a hole for a habitation in the manner of the Fiddler, with which it associates by dwelling in the same vicinity.

The small reticulate divisions of the sides of the body, are either perfectly square, rhomboidal, or hexagonal, according to the direction in which they are viewed, they may also resemble right lines by a perpendicular view, which shall bring the inflected portion of the seta parallel over the granulated line.

Fearful of multiplying genera without full and sufficient grounds, I have retained the genus *Ocypode* in the comprehensive sense of Mr. Latreille, in order to place under it the present animal. Doctor Leach has divided *Ocypode* into several genera, but perhaps the characters are not sufficiently noted, or, which is more probable, the division must be still further extended. With this view all the characters possible ought to be given, in order to enable naturalists to

decide without loss of time. A very good character may be drawn from the lateral line; this line, which does not exist in the present species, arises from near the middle of the edge of the thorax, passes obliquely across the side of the body, and terminates at the penultimate hip joints; in the two preceding species, this part is as prominent as the edge of the thorax. A second good character may be derived from the form and proportion of the second peduncular joint of the external pedipalpi, in the two preceding species, and their congeners, this part is formed, as it were, by a prolongation of the lines of the basal joint, of which it is not more than half of the size; but in the present species the form is altogether different, and approaches to that of the same part in *Grapsus*, and perhaps *Gecarcinus* of Leach; it is nearly oval, a little emarginate at tip for the insertion of the palpi, and inclined inwards, so as to form an angle with the preceding joint, thereby leaving a considerable interval in the middle of the mouth, in size also it is nearly equal. The very dense brush of hair, which is attached to the inside of the third and fourth pairs of hips, may furnish another character. It is not conspicuous in the species under consideration. In this species also the tibia and tarsi are not spinose as in *Grapsus* and *Gecarcinus*, neither are the tarsi dilated so as almost to resemble a third joint of the tibia as in the former. The *reticulatus* in the rigid arrangement of Dr. Leach cannot be referred to the *Ocypodes* of which the type is *O. cera-taphthalma*; neither will it agree with *Uca*, of which the anterior feet are very unequal, nor with *Goneplax*, in which they are very much elongated.

By its cubical body and general habit, it certainly approaches the *Ocypodes*, &c. but by its oral and other arti-

ficial characters it seems to claim proximity to the genus *Grapsus*, notwithstanding its diverse mode of life.

These considerations and comparisons have induced me to indicate the characters partially, of a new genus for this animal, under the name of *Sesarma* (from *σαρμα*, the act of gaping,) this genus of course can be adopted or rejected, by those who have an opportunity to examine a more numerous list of species of its neighbouring genera, than I can obtain access to.

Genus SESARMA.

Antennæ short, inserted in a right line between the eyes, under the clypeus; seta of the interior ones shorter than the preceding joint; second joint of the peduncle of the external pedipalpi, oval, as large as the first, and forming an angle with it on the inner edge; palpi attached to the outer tip, first joint compressed, rather longest, second and third nearly equal, not reaching the base of the second joint of the peduncle; body somewhat cubical; arms equal; no oblique lateral line, or prominent dense hair between the third and fourth hips; tarsi simple, conic, acute.

Genus LIBINIA. Leach.

MAJA. Fabr. and Latr.

Thorax rounded, spinose, with dense hair; *rostrum* entire; *eyes* hardly thicker than their peduncles; *orbit* with a fissure above and one beneath; *exterior antennæ* as long as the *rostrum*, the first joint longer than the second, the third slender; *external double pedipalpi* with the second joint of their internal peduncle, abruptly and deeply emarginate, for the insertion of the palpi, and with its interior

side, near the base, emarginate for the reception of the prolongation of the first joint: *anterior feet* not much thicker than the others, which are similar to each other, and not very long.

SPECIES.

1. *L. canaliculata*. Thorax densely hairy, with about seven lateral spines, and a few usually shorter ones on the back; Rostrum emarginate at tip, canaliculate between the eyes; anterior feet unarmed, granulated, hands elongated; fingers white at tip.

Inhabits bays and inlets of the coast.

Plate 4. fig. 1.

Rostrum beneath glabrous and white, a deep notch at tip; Orbita orbicular, with a spine before, and three smaller ones beneath, a fissure above near the posterior canthus, and one opposite beneath; Labrum deeply impressed in the middle; anterior angles of the mouth prominent, forming an irregular tubercle, behind this tubercle, and the posterior spine beneath the eyes, is a profound puncture like an aperture, from which arises a deep groove, that curves before the anterior lateral spines and joins an impressed, abbreviated, transverse line which is on the middle of the thorax, the above line is confluent before its termination in the transverse line with a less deeply impressed one which meets the fissure, then curves over the orbit of the eye, and terminates at the base of the rostrum; two of the anterior lateral spines of the thorax are placed lower than the others, appearing to be interrupted continuations of the margin or edge of the thorax; a series of four or five tubercles placed longitudinally on the back behind the impressed line of the middle, and two

often obsolete ones before it; several other spines more or less conspicuous, but of which about four are always more prominent, are placed on the back between the dorsal and lateral rows. Feet long, covered with short dense hair, second and third pairs rather longest; tarsi long, conic, incurved, without striæ, furnished at tip with a yellowish glabrous nail, which is perceptibly a little elevated at its origin above the common surface of the tarsus of which it is a little more than one fourth of the length, grooved with a line each side and one beneath to a level with the general surface of the tarsus; anterior feet granulated, wrists unarmed, or with an obsolete tubercle on the inner angle, hands subcylindrical, a little compressed, linear, hardly smaller near the base, condyles of the base prominent; fingers about half as long as the palm, with regular obtuse teeth, and an impressed lateral line on each.

Length about two inches and a half, breadth more than two inches.

Known on many parts of the coast of the United States by the name of *Spider Crab*, *Sea Spider*, &c. is very commonly brought ashore by the nets of the fishermen, but is not used as food. Walks with a wary, measured step, as if fearful of making a noise. Comes near to the description of *M. hircus*, *Gmel.* but differs in not having the "arms muricated;" to *L. emarginata* of the Zool. Miscel. vol. 2. tab. 108, it is closely related, but the arms are much longer.

*Genus LISSA. Leach.**MAJA of Fabr. and Latr.*

Thorax tuberose, with a fissile rostrum: *rostrum* with the laciniæ meeting; *eyes* rather thicker than their peduncles; *orbit* with one fissure below and another behind. *External antennæ* with the basal joint thicker and longer than the next. *External double pedi-palpi* with the second joint of their internal peduncle, half as large as the first, and truncate; emarginate. Anterior feet hardly thicker than the others (of the male, as long as the body; of the female, shorter than the body;), which are similar to each other and of moderate length; *tarsi* simple.

1. *L. fssirostra.* Rostrum depressed, fissile, tapering to the tip; thorax verrucose; terminal joint of the abdomen transversely cliptical.

Inhabits the coast of Long Island.

Thorax destitute of spines, unequal, a little verrucose, gradually tapering from behind to the orbits, sides rather abruptly deflected not decurved, impressed above the insertion of the anterior feet, edge of the thorax verrucose, edge of the shell uninterrupted; orbits of the eyes round and equal before, without any spine or tooth in front, posterior canthus with a large, triangular, prominent, depressed tooth, distinguished from the orbit by a profound fissure above and sinus beneath; rostrum much depressed, broad at base, diminishing by a line somewhat curved, to an obtuse tip, and cleft to the base; body beneath impressed between the anterior feet; anterior feet slightly verrucose, carpus without any spine, hands equal, punc-

tured, linear, not elongated; fingers nearly as long as the hand, punctured above, with an impressed punctured line each side, and white tip, may teeth within; terminal joint of the abdomen transversely elliptical.

Length one inch and three fourths, breadth one inch and one fifth.

This curious, and, as I believe, new species, was found by Mr. C. A. Le Sueur, on the coast of Long Island, and kindly communicated by him to the author. It is a male. Upon the body, rostrum, and feet are a number of hooked, short, stout, yellowish hairs, arising from pores, and curving in various directions, but generally backwards; they are not unlike in appearance to a young vegetable production: these arrest and entangle the loose portions of fucus, or other marine plants, amongst which these animals are found, so as to conceal them from their prey, that they may the more readily surprise it; so completely are they sometimes covered as to appear like a moving mass of various kinds of marine plants, no portion whatever of the animal being visible; this habit is not peculiar to the individual here described, but is most probably common to the species of this and the cognate genera, such as the genus *Pisa*. Mr. Le Sueur informs me, that he has seen Crustacea in New Holland, with the same habit; the fucus, in some instances, was so much entangled with the hooks, feet, &c., as to be with difficulty removed.

(To be continued.)

A short description of five (supposed) new species of the genus *Muræna*, discovered by Mr. Le Sueur, in the year 1816.—by C. A. Le Sueur. Read August 19, 1817.

Genus MURÆNA. La Cepede.

Generic Characters. Pectoral, dorsal, caudal and anal fins; *nostrils* tubular; *eyes* covered by the common skin; *body* serpentiform and mucous.

1. *MURÆNA rostrata*. *Snout* elongated, pointed and strait; *eyes* large, and situated very near the angle of the mouth; *body* tumid in the centre, and narrowed to a point at both extremities; upper parts varied with gray and olive, sometimes of a slate blue, lower parts white; *dorsal* and *anal fins* reddish, which colour deepens as it approaches the tail; *pectoral fins* small, acute and bluish.

Length from eighteen to twenty-four inches.

Inhabits the lakes Cayuga and Geneva, in the state of Newyork; is esteemed for the table.

2. *M. Bostoniensis*. *Jaws* acute and short; *pectoral fins* short and subovate; *body* subequal, above of a dark olivaceous brown, *throat* and *abdomen* grayish, region of the *anus* yellow ochre, towards the tail reddish. Length about twenty-four inches.

This *Muræna* is sometimes brought to market in the town of Boston, Massachusetts; it is not much valued as an article of food. Its vulgar name is Snake Eel.

3. *M. serpentina*. *Pectoral fins* very large and subo-
ate; *head* large, *snout* short; anterior part of the *body*

larger than the posterior part, the size diminishing gradually to the tail; colour a dark copper brown, which is lighter on the *sides* and *belly*; the *fins* of the colour of the body, though paler; the *dorsal fin* has its origin nearer the pectoral ones than that of the preceding species.

Inhabits the harbour of Newport, Long Island. It is generally taken with a gig, whilst swimming under the bridges, and thoroughfares of the wharves. It is much esteemed. This species is likewise named Snake Eel by common observers.

4. *M. argentea*. *Upper jaw* short, elevated, at the point, above the centre of the eye; *body* short; *pectoral fins* very near the head; *spiracles* large, and as long as the base of the pectoral fins; colour silvery-gray, with sometimes a dash of yellow; *cheeks* yellowish white; *body* very much compressed.

Inhabits Boston Bay. Its common name is Silver Eel. It is an edible fish.

5. *M. macrocephala*. *Snout* short; *lower jaw* reflected; *head* very large and elevated; *eyes* large and prominent; *pectoral* and *anal fins* reddish; *dorsal* and *anal fins* terminated in a point; colour above olivaceous yellow; from the angle of the mouth a golden band extends beyond the pectoral fin; the lower parts pure white.

The common name of this species is Bull-head Eel. It inhabits the waters of Saratoga, in the state of New-york. I have seen, in the markets of Philadelphia, a Muræna which very nearly resembles the above, so much so that I am unwilling to consider it a distinct species. The Bull-head Eel is a good table fish.

Mr. Noel of Paris has informed me that a German

naturalist, who had travelled in North America, published some years ago, in Europe, an account of some of the fishes of the United States. This work I have earnestly desired to see, but my friends here have not been enabled to procure it for me. It is possible that some of the above described fishes, as well as others which I at present consider as nondescripts, may have been noticed by the German naturalist.

Description of two new species of the genus Gadus. By
Mr. Le Sueur. Read August 26, 1817.

In the fresh water lakes and rivers of North America, there have been found two species of the *Cod* family, which species I have classed in the third subgenus of the table of La Cepede, the characters whereof are, " *Two dorsal fins; one or many beards at the end of the snout.*" The two species in question have a general resemblance to the *Gadus molva* of Linne, the *Asellus longus* of Willughby, p. 175, mem. 2, cap. 2, tab. L. ed. 1686; and likewise the *G. Danicus*, of which Muller gave the first description. This resemblance consists in the lengthened form of their body, and the conformation of their fins; but the following specific characters indicate an important difference.

1. *GADUS maculosus.* Jaws equal, lower one with a single cirrus; ground colour of the body reddish, marbled with brown, with roundish white spots scattered throughout; head large, long and depressed; eyes oblong, in a vertical line with the angle of the mouth; nostrils double;

anterior one elongated into a small barbel; *pectoral fins* long, subtriangular, placed horizontally; *jugular fins* pointed, falciform and whitish; *anal fins* shorter than the *dorsal*, and marked with pale spots; *caudal fin* large and rounded; *body* mucous, covered with small roundish scales, resembling depressed tubercles; *lateral line* in the middle of the body; *teeth* small, sharp, and disposed in twelve or fifteen ranges, resembling those of a wool-card; the *palate* and *throat* are equally furnished with teeth.

Branchiæ 7. P. 18. D. 10—71. Jug. 6. A. 70.
C. 44 rays.

The above described species I discovered in Lake Erie, on the 10th of July, 1816. It is an esteemed fish, and is commonly known under the names of Dog-fish, and Eel-pout. My specimen was two feet four inches in length.

2. *G. compressus*. *Head* short, upper *jaw* longer than the lower, which has one cirrus or beard; the *body* is shorter in proportion than that of the preceding species, the *back* more elevated at the base of the dorsal fins, and much more compressed at the *tail*, which tapers regularly to the *caudal fin*; colour of the *body* amber, marked with spots of the same; *dorsal* and *anal fins* equal; the first *dorsal fin* has seven or eight rays, the second *dorsal fin* ornamented with two rows of umber spots; *pectoral fins* rounded; *caudal fin* more elongated than that of *G. maculosus*; the *skin* of the fins is so thick and mucous, that the rays cannot be distinguished; the *nostrils*, *teeth*, *scales*, and *jugular fins* resemble those parts of the foregoing species. Length of specimen eight inches.

This species was discovered, and politely communi-

cated to me, by Dr. Hunt, of Northampton, in the state Connecticut. It inhabits the river Connecticut; is rare, and, in consequence of its insignificant appearance, is held in no esteem as an article of food. It is said to affect solitary situations, and to be a suspicious, wary fish.

Description of a new species of the genus Cyprinus. By
Mr. Le Sueur. Read August 19, 1817.

CYPRINUS maxillingua. Colour of the *back* brownish olive, *sides* blue, with a brownish band; a black spot at the base of the *caudal fin*; lower parts silvery gray; the *body* is thick; on the back, near the head, the *scales* are very small, they are larger on the sides; the *snout* is very short, broad and convex; the *mouth* is not furnished with lips, in the manner of some others of the genus: the upper jaw is large, fixed, and covers the lower jaw, which, on a superficial view, appears to want the *os maxillare*, but on a close examination it will be found that this bone is enclosed in a kind of cartilaginous, unretractile tongue, which projects from the mouth in a subarcuate manner; on each side of this tongue there is a muscular lobe, which admits of the free expansion of the mouth; the true tongue is not apparent; the *head* is large, and, with the *opercula branchiostega*, is deprived of scales; the *eyes* are of a middling size, *pupil* black, *iris* yellowish white: the *lateral line* has its origin at the upper part of the gill-cover, curves regularly to the middle of the body, and descends thence, in nearly a straight line, to the tail; the *dorsal fin* is large, quadrangular, and situate in the centre of the body, opposite to the *ventral*, the roundish extremity of which ex-

tends as far as the base of the *anal fin*; the tail is short, strong, and terminated by a forked fin. Length of specimen nearly four inches.

Mem. bran. 3.—*P.* 18.—*V.* 8.—*A.* 9.—*D.* 9.—*C.* 9
principal rays.

This singular fish I discovered in Pipe-Creek, Maryland, where it is called *Little Sucker*, in June, 1816. From the description of its mouth it will be seen that it is not properly a *Cyprinus*, and I have reason to conjecture that it will constitute, hereafter, a separate genus; but until the discovery of another similar species, I shall content myself with its present arrangement.

An account of an American species of Tortoise, not noticed in the systems. By C. A. Le Sueur. Read September 23, 1817.

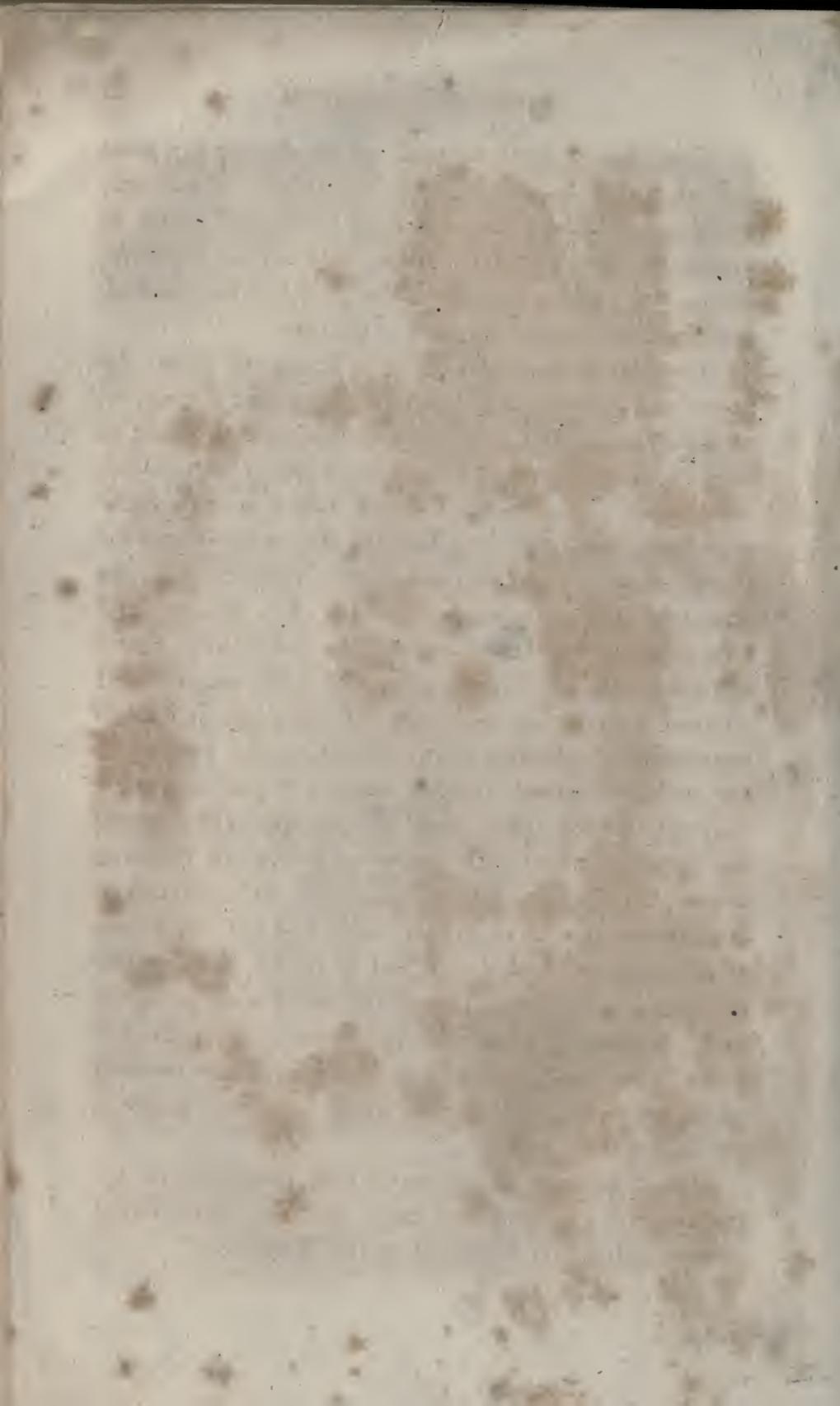
LAKE ERIE TORTOISE,

TESTUDO GEOGRAPHICA.

Plate V.

In the summer of the year 1816, I discovered in a marsh, on the borders of Lake Erie, a Tortoise, which I have reason to believe is a nondescript. This species, which, at the first view, appears to resemble the *T. reticulata* of Bosc, and likewise the *T. serrata* of Daudin, is nevertheless distinct, as will be evident from a comparison of the figures and descriptions of the above named Tortoises, in Daudin's "Histoire Naturelle des Reptiles," with mine.





Description. *Back* elevated before, sloping to a point behind, where the shell is deeply emarginate, subcarinate; *shield* suboval, the sides pressed in; lower *shell* nearly as long as the upper; *head* triangular, *snout* obtuse; *mandibles* sharp, and without denticulations; *fore feet* five-clawed, *hind feet* four-clawed, all the feet palmate.

The *vertebral scutella* are of a hexagonal form, the posterior one wider than long; the two centre *laminæ*, on each side of the disk, almost quadrangular: the *scutella* of the margin are sharp, the three anterior pieces large, somewhat oblique, those in front sinuate, falling in on the *collar scutellum*, and projecting beyond the next—from the fourth to the seventh they are narrow, and reflected, the remainder subquadrangular, oblique, flat, sinuate, and emarginate at their commissures; the lower *collar plates* furnished with small eminences; *shell* below smooth, and covered with a thin epidermis, of a bay colour; *shield* smooth, of a yellowish brown colour, mixed with chestnut, and ornamented with pale sinuous stripes, irregularly intersecting each other, these stripes approximating on the vertebral scutella; the *marginal pieces* are bordered above with black and yellow, below they are marked with semiconcentric lines of yellow, black and red: the colour of the *head*, *neck*, *tail* and *feet* is dusky, with yellow markings; the broadest part of the *shield* is at the eighth marginal plate; *anal scutella* largely emarginate. Length of the upper *shell* eight inches; width across the pectoral plates five inches—the greatest width six inches; height of the animal three inches.

The stripes or markings on the disk, presenting the appearance of a geographical map, gave rise to the trivial name which I have bestowed on this Tortoise,

A more particular description is not thought necessary, as the figure accompanying this article will convey a better idea of the animal than can be given by any verbal detail.

A new genus of Fishes, of the order Abdominales, proposed, under the name of Catostomus; and the characters of this genus, with those of its species, indicated. By C. A. Le Sueur. Read September 16, 1817.

The genus *Cyprinus* of Linne, included a considerable number of fishes, of supposed congenerous habits and conformation; and it has since his time been enlarged by important additions; hence it has become necessary to the advancement of the ichthyological student, to form new genera from this increasing family. Recently Mr. Cuvier proposed as the type of a subgenus, the *Cyprinus barbus* of Europe; and notwithstanding this division, there still remains a species which will form the basis of another division, or of a separate genus. This was described and figured by Forster, under the name of *Cyprinus catostomus*; (Phil. Trans. vol. 63.) and is the only (certain) species of the kind recorded by La Cepede, and Shaw. A second was described and figured by Mr. Peck, in the Memoirs of the American Academy of Arts and Sciences of Boston, vol. 2, part 2, p. 55, pl. 2, fig. 4, likewise under the name of *catostomus*. Dr. Mitchell, in the Transactions of the Newyork Historical and Philosophical Society, describes two species, one under the name of *oblongus*, and the other under that of *teres*, which last he conjectured might prove the *catostomus* of

Forster. But as far as I am enabled to determine, the whole four are specifically distinct.

Since the publication of the above, I have been made acquainted, by ocular testimony, with the existence of eleven (supposed) new species, of similar characters, which, with the above named four, will form a group of fifteen species. The common characters of these fifteen species are sufficiently striking to distinguish them from the rest of the Cyprinii; and would justify one, either in subdividing the genus, or, which would be more scientific, in creating a new genus, of which I here propose the establishment, under the name of *Catostomus*, the appellation which Forster gave to the species he described, and which was said to have been discovered at Hudson's Bay.

Genus CATOSTOMUS.

Characters.

Back with a single fin.

Gill-membrane three-rayed.

Head and *opercula* smooth.

Jaws toothless, and retractile.

Mouth beneath the snout, lips plaited, lobed,
or carunculated, suitable for sucking.

Throat with pectinated teeth.

The species which are here described are all possessed of the following general characters:

Body. The *body*, in general, is elongated, and varied in its form.

Scales. The *scales* in almost all the species are marked with radiated lines, and fimbriated on their edges; their form more or less rhomboidal, or roundish.

Gill-covers. The *gill-covers* are large, and composed of three pieces: the anterior piece small in some, as is exemplified in the *C. macrolepidotus*, and in others large, as in the *C. communis*; opening or expansion wide.

Nostrils. The *nostrils* are double on each side, and separated by a membrane: the largest aperture near the eye.

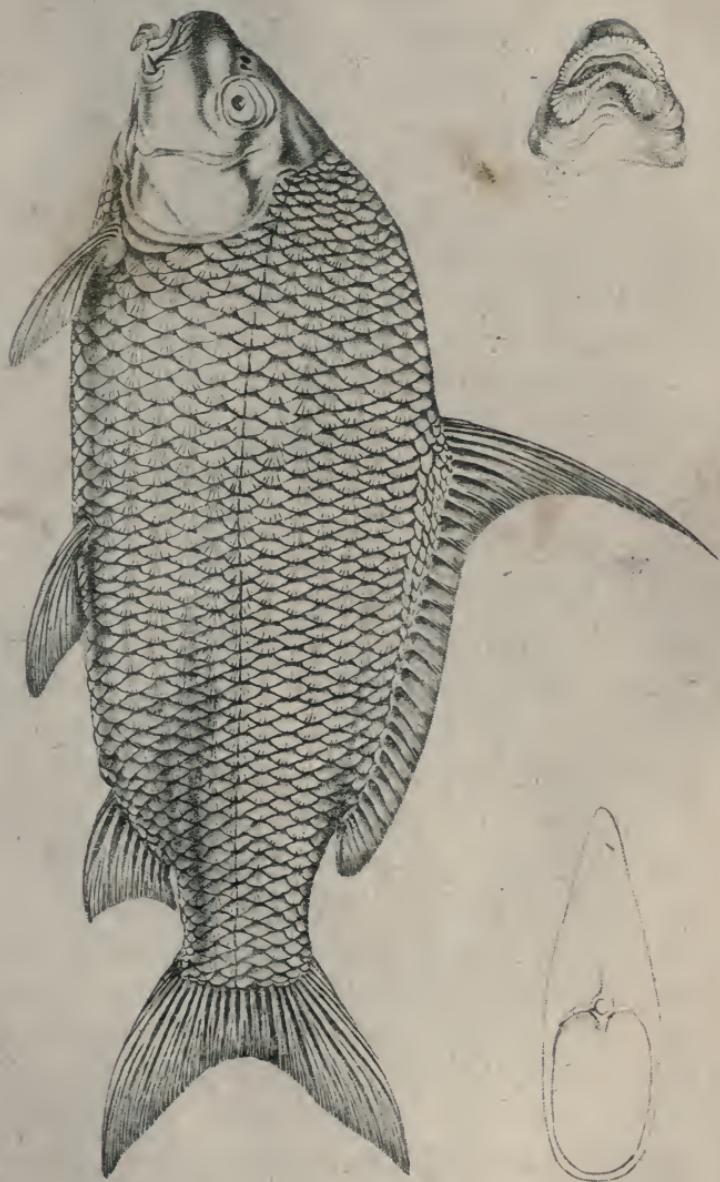
Eyes. The *eyes* in general are pretty large, a little oblong, without nictitating membrane, pupil black and roundish, irides yellowish, sometimes brown, as in the *C. gibbosus*.

Teeth. No *teeth* in the jaws: but those of the throat, on each side, are composed of a range of bones, generally blunt, and thick at their summits, placed in a pectinated form, on an *osseus*, arcuated base, of which they are a component part; and sometimes terminated in a hooked point, as in the *C. maculosus*: these teeth are enveloped in a thick mass of a whitish substance, which covers the throat, and supplies the place of a tongue.

Mouth. The *mouth* is generally lunated; to the palate is attached a membrane.

Viscera. The *intestinal canal* is very much developed, and it has its origin near the throat: the *stomach*, which is simple, and without plaits and curvatures, being a continuation of this canal, and appears to be confounded with it. The intestines make a number of circumvolutions; in a specimen of the *C. macrolepidotus*, of sixteen inches long, they were three feet five inches in length. The *liver* is deliquescent, and soon passes into oil after exposure to the atmosphere. The *air-bladder* is subcylindric, and divided, in most species, into two parts; in the *C. macrolepidotus* it is separated into four parts. I have remarked

R. Lefevre Del. Inv. & Eng.



C. C. IMPRINTS



in the intestines of these fishes, river shells of the genera *Lymnaea*, *Bulimus*, &c. which dwell on aquatic plants, and on the rocks at the bottoms of rivers: these shells the *Catostomii* are enabled to take with their lips, which are protruded forward by means of their jaws.

It is necessary to remark, that in all the species, which I have examined, there is a line which runs from the nape, beneath the eyes, and another along the head, above the eyes, of small orifices, for the passage of mucous; which lines are well defined after the fish is dead and desiccated, but not so conspicuous when recent: these lines Forster improperly terms sutures. I will add, that some species, in a dried state, have also a tuberculated appearance on the head, which tubercles are not discernible when the animals are living.

Observation. These fishes are not in general estimation, the flesh of the major part being soft and insipid. The *C. Cyprinus* appears to be more valued than the rest; it becomes very fat, and is common, at certain seasons, in the markets of Philadelphia. Their habits, and the mode of taking their food, preserve them from being taken with the hook, in common, though it is said that some of them may be thus caught by the allure of a peculiar bait; those which are brought to market are taken in seines, but they are not the object of a particular fishery. Some of the species are seen in market the whole year; and others are only brought in September, November, and the beginning of spring. In the winter, the greater part retire to deep water.

1. *CATOSTOMUS CYPRINUS*. Body compressed, elliptic, sharp at the base of the *dorsal fin*, which is very long, and falciform on its anterior part, and low behind.

Head declivous; *snout* short, rounded, projecting beyond the jaw; *anal fin* lunated; *caudal fin* forked, with pointed lobes; *pectoral* and *anal fins* small; all the fins of a gray-blue colour; *eyes* somewhat oblong; the *scales* are very large, semirhomboidal, and variegated with blue, yellow and green reflections; the *lateral line* has its origin near the upper part of the operculum, and passes down the centre of the body: *lips* a little less developed than in the remainder here described.

P. 18.—D. 31.—V. 9.—A. 10.—C. $18\frac{1}{4}$ rays.

This is the stoutest species of the genus yet known: it arrives to the length of twenty inches. Its vulgar appellation is *Carp*, a name which I have preserved, in consequence of its resemblance to the Common Carp of Europe. Inhabits the fresh water tributary streams of the Chesapeake Bay, particularly Elk river, which supplies the markets of Philadelphia.

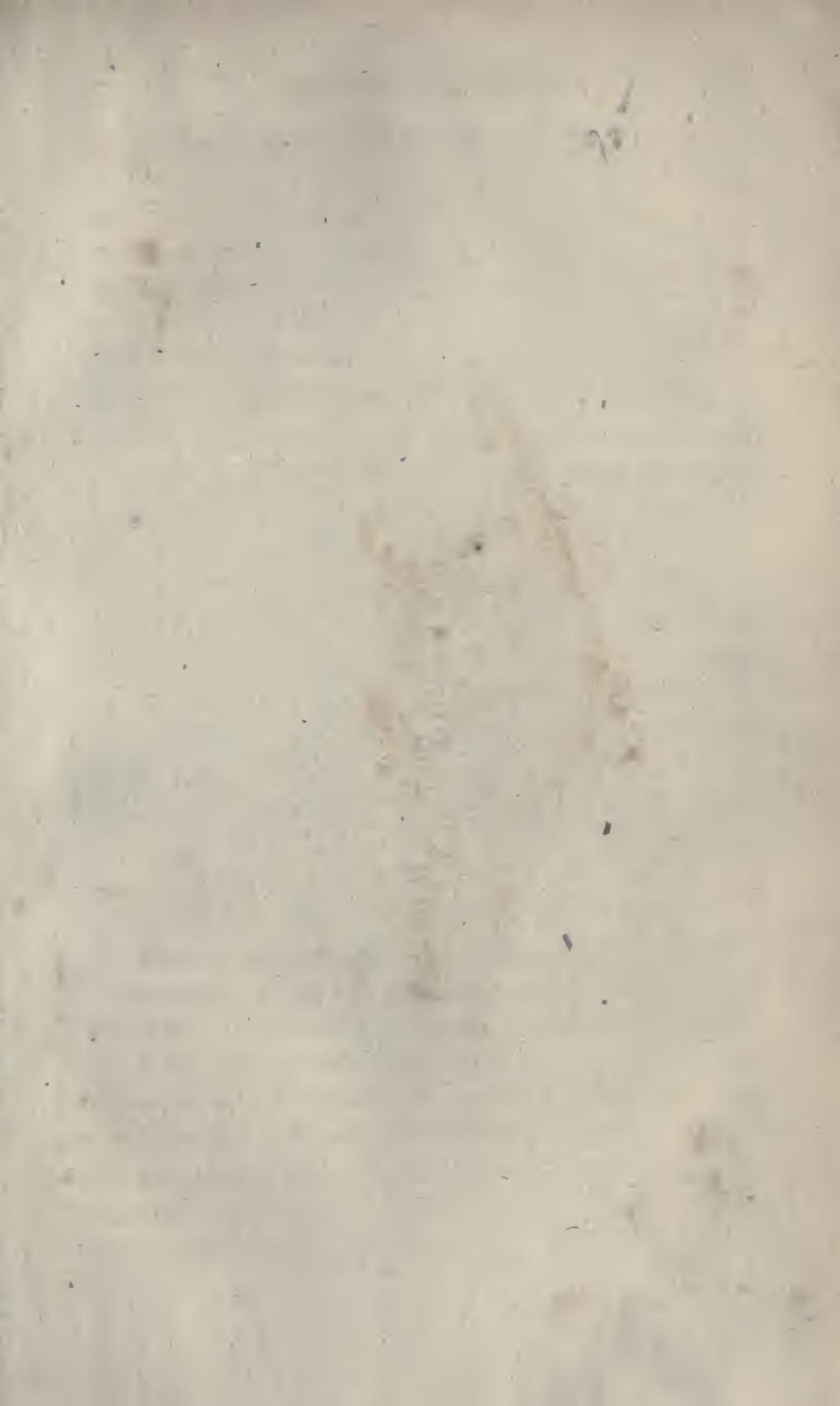
2. *C. gibbosus*. *Back* elevated in front of the *dorsal fin*, which is almost as high as broad, and rounded; *anal fin* bilobated.

Head nearly as high as long; *snout* short, roundish; *tail* strait; *caudal fin* semilunated, lobes roundish, the inferior one longer than the upper; *scales* very much crowded, transversely, a short distance from the opercula, but more developed on the rest of the body; the colour of the *back* is a deep blue, with golden reflections; *pectoral*, *ventral* and *anal fins* of a fine reddish orange colour; *caudal fin* tinted with carmine and violet: *dorsal fin* bluish green; abdominal *scales* red at their base; *lateral line* hardly perceptible; *body* marked with four or five faint, transverse bands. Length of specimen eleven inches.

C. GIBBROSUS.







C. TUBERCULATUS.

C. tuberculatus



P. 16.—D. 17.—V. 9.—A. 9.—C. 18 rays.

This species I discovered in the river Connecticut, near Northampton, where it is named Chub Sucker.

Dr. Mitchell's description of the *Cyprinus oblongus*, approaches to this; but there are important characters in my species, not noticed in that of the former, which preclude a conclusion that they are the same; therefore, as the matter now stands, I must consider the above a nondescript.

3. C. *tuberculatus*. Snout furnished with three tubercles, placed in a triangular form, on each side; *caudal fin* lunated, lobes rounded and equal.

The *body* of this species resembles much that of the preceding, but it is less elevated on the *back*, and more thick; the *scales* are more equal, are more rounded on the back, and do not crowd on each other near the *opercula*, as in the preceding; *body* with seven or eight faint transverse bands; *back* of a bluish brown colour, *sides* yellowish or cream colour, *abdomen* whitish; all the *fins* brownish; above the *anal fin*, the tail is more inflated than that of the *gibbosus*. Length of specimen five inches.

P. 16.—D.—15.—V. 8.—A. 8.—C. 18 rays.

The existence of this remarkable species was first made known to me by Mr. Titian Peale, the youngest son of Mr. Charles Wilson Peale, the venerable proprietor of the old Philadelphia Museum: a young gentleman whose zeal in the study of Natural History does him much honour. It inhabits the small inland streams of Pennsylvania. The individual described was taken at the country seat of Mr. C. W. Peale, situated near German-

town, within six miles of Philadelphia, and presented to me by my friend Mr. Ord.

I have since seen a fish which resembled the above, but it wanted the snout tubercles. Perhaps it may be the opposite sex. On this question I am not at present prepared to decide.

After the foregoing description was in type, I had the satisfaction of meeting in the market of Philadelphia, several large specimens of this species, one of which I procured, and it measured from the end of the snout to the extremity of the caudal fin twelve inches, three inches deep at the base of the dorsal fin, and one inch and a half in thickness; its scales were distinctly radiated, and reflected brilliant iridescent colours, resembling those of the neck of some varieties of the house Pigeon; the colour of the pectoral, abdominal and anal fins was of a pale orange; the bands, which in the first described individual were distinct, were hardly perceptible in the present; the snout tubercles appeared to have fallen off, leaving a pale spot, encircled with brown, and a larger ring of yellow; irides brown, pupil black surrounded with a reddish ring.

P. 16.—D. 15.—V. 9.—A. 10.—C. $18\frac{1}{4}$ rays.

4. *C. macrolepidotus*. *Dorsal fin* short, greatly hollowed, upper lobe elevated and pointed, lower lobe rounded.

Body a little compressed and fusiform, elevated on its anterior part, rounded near the nape; *head* somewhat declivous, and longer than deep; *anal fin* strait, long, and passing the base of the *caudal*; *pectoral* and *abdominal fins* small; *caudal fin* forked, with pointed lobes, and of a gray colour; *dorsal, anal* and *ventral fins* tinted with blue and yellow; *scales* large, and disposed in a lozenge form; colour

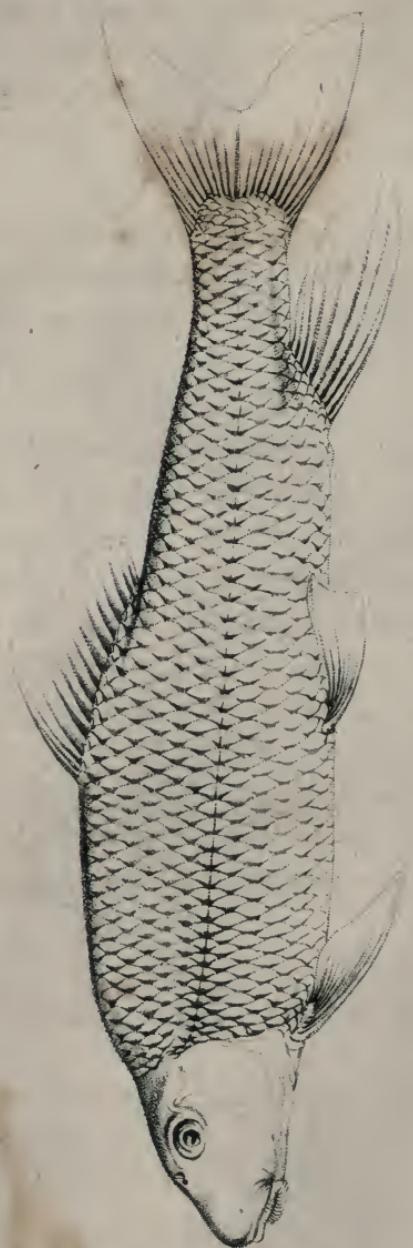
C. MACROLEPIDIOMYS





C. MARKOLITS

Foto & c. J. M. S. 1878.



of the *back* dark blue, base of the scales brown; *sides* whitish, with yellow reflections; *opercula* yellowish; *head* reddish brown; the *lateral line* rises at the nape of the neck, descends along the gill-cover, and thence to the tail in a line with the centre of the eye. Found in the river Delaware.

P. 18.—D. 16.—V. 9.—A. 9.—C. $18\frac{5}{3}$ rays.

5. *C. aureolus*. *Anal fin* long, pointed, and passing considerably beyond the base of the *caudal fin*, which is forked, with pointed lobes, the inferior of which is the largest; *abdominal fin* truncated.

Body subcylindric, elevated at the nape; *head* quadrangular, gibbous above the eye, almost as high as long; the rays of the anal fin are very strong and large; *scales* rhomboidal, equal; *body* of a beautiful orange colour, which is deepest on the back, the base of the scales dark red; the *sides* are heightened with golden reflections; *pectoral*, *ventral* and *anal fins* of a fine red orange, *caudal fin* of a deep carmine colour—the *dorsal fin* is paler than the rest; the *lateral line* is nearly straight, and commences in a line with the eye. Length of individual described sixteen inches, its depth three inches, and its thickness two inches and a half.

P. 18.—D. 14.—V. 9.—A. 8.—C. 18 rays.

This beautiful species I discovered near Buffalo, on Lake Erie.

6. *C. communis*. *Dorsal fin* quadrangular; *anal fin* narrow, and extends as far as the base of the *caudal fin*, which is somewhat lunated, with rounded lobes, the inferior lobe rather the longest; *eyes* situated nearer the posterior part of the opercula than the tip of the snout; *mouth* very large.

Body subcylindric; *snout* and *head* more lengthened than those of the foregoing; *head* depressed; *scales* roundish, regular, of a medium size; general colour of the head and back a reddish brown, in some specimens darker than in others; *sides* reflecting golden tints; *abdomen* whitish; *pectoral*, *ventral* and *anal fins* reddish brown; *caudal fin* of a reddish violet colour; *dorsal fin* blue and yellow; the *lateral line*, after its base curve, descends to the tail below the parallel of the centre of the eye. Length of specimen sixteen inches.

P. 18.—D. 14.—V. 10.—A. 9.—C. 24 rays.

This species is taken in the Delaware, and is very common in the markets of Philadelphia. The fishwomen commonly exhibit them to sale in bunches, strung on the pliable branches or twigs of the Willow. As an article of food they are not esteemed, and they generally fall to the lot of the poor.

(To be continued.)



It is with pleasure that we acknowledge our obligations to Mr. Le Sueur for the plate, No. 4, which accompanies the present number.

The figures from 1 to 6 are referred to in Mr. Say's account of the Crustacea of the United States; the remainder will be here explained.

Fig. 9, represents the *Cerapus tubularis*, in its tube, of the natural size.

Fig. 7, the same magnified.

Fig. 8, the animal, divested of its habitation, magnified.

Fig. 10, a foot of the second pair.

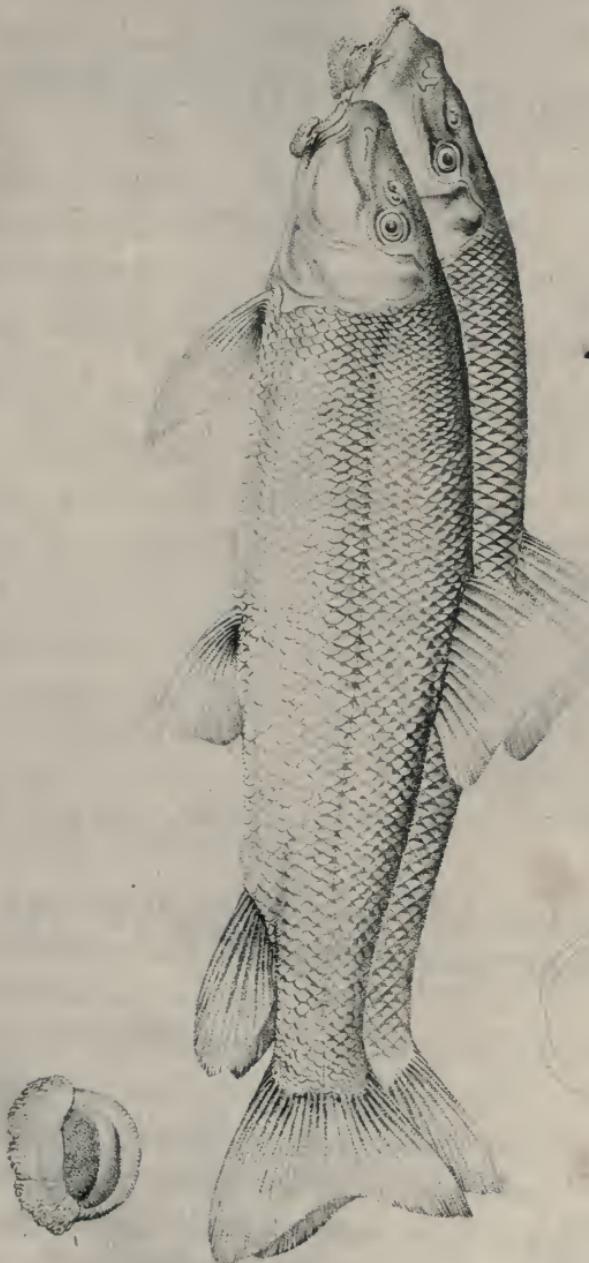
Fig. 11, the tail.

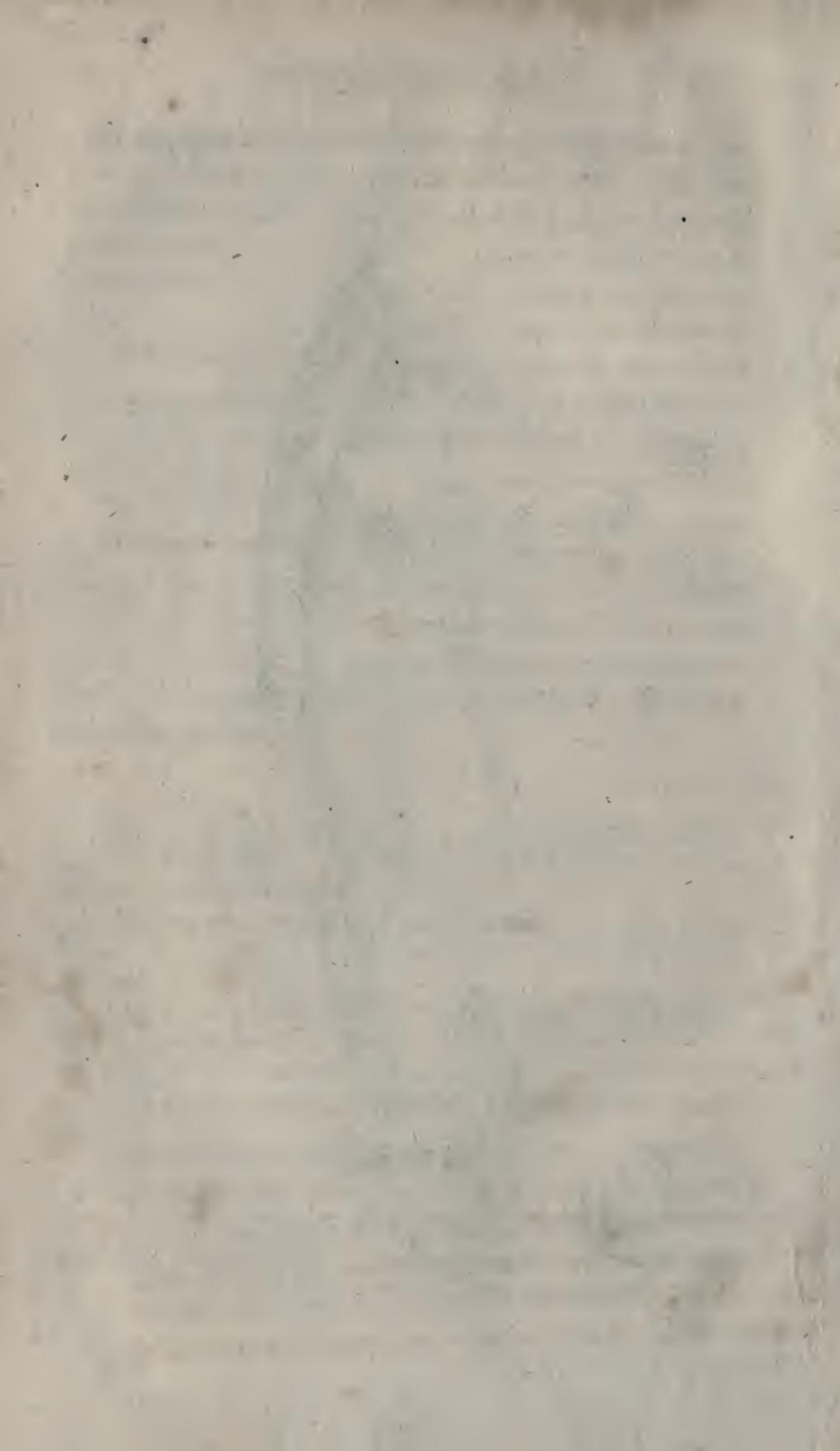
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STEREOMYIA

Larvae, 1906
and pupae





JOURNAL
OF THE
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OF
PHILADELPHIA.

No. 6.

OCTOBER, 1817.

VOL. I.

An Account of the Crustacea of the United States. By Thomas Say. Read October 7, 1817.

(Continued.)

Since the preceding part of this paper was put to press, Captain James Hamilton presented to the Academy several crustaceous animals collected by himself in the Gulf Stream; amongst these were some specimens of *Lupa pelagica*, of which I have inserted a description in order to exhibit the difference between it and the *L. hastata* which it resembles considerably.

LUPA pelagica. *Clypeus* four-toothed; third joint of the anterior feet four-spined; *carpus* two-spined; *hands* ciliated on the interior upper edge.

Inhabits the Gulf-Stream.

Portunus pelagicus. *Fabr.* and *Latr.*

Thorax variegated, with minute granulæ; seven of the lateral teeth equal, equidistant, one at the posterior canthus of the eye larger, posterior tooth much larger, spiniform; *clypeus* four-toothed, and the anterior canthus of the eye elevated, the two middle teeth rather smaller, third

joint of the anterior feet four-spined on the anterior edge, posterior spine smallest, and nearer to the next; *carpus* two-spined; *hand* with six or seven elevated lines, the upper one terminating in a spine at the base of the thumb, a short, thick spine at the base of the hand and the anterior angle of the carpus; *fingers* hooked at tip, with impressed lines, each armed within by about four teeth, which are furnished with lateral, accessory, smaller ones; remaining feet annulate with dusky. Length of the specimen three fourths of an inch.

From this description of the *pelagica*, compared with that of the *hastata*, it appears, that the principal difference consists in the number of teeth of the clypeus, of the number of spines on the third joint of the anterior feet and carpus, and the elevated thoracic lines; the habitat also indicates a difference, the former being pelagic, and the latter littoral; the colour of the *hastata* is olive-green on the thorax and feet above, beneath white, anterior feet within bright blue, fingers of the male tipped with purple, of the female red, with purple tips; condyles and spines of all the feet more or less red, remaining feet bluish green on the sides.

The *pelagica* is generally found amongst floating *fucus*, &c. it is subject to the attack of a parasitic worm, which may be seen through the shell, resembling a small, oval, yellowish spot; these are frequent on various parts of the animal, and may readily be mistaken for maculæ on the shell.

Genus GRAPSUS.

Thorax subquadrate, depressed; *eyes* not larger than the peduncle, which is short and placed at the anterior angles; *abdomen*, in each sex, seven-jointed; *tarsi* dilated, and,

with the second joint of the tibia, armed with moveable spines; *hands* equal.

SPECIES.

G. *cinereus*. *Thorax* rugose, with a sinus behind the anterior angle; *clypeus* entire; third joint of the first pair of feet serrate within, and dentate at the tip; *carpus* one-spined; *hands* granulate beneath.

Found in the Gulf-Stream, common.

Grapsus cinereus? Latr. hist. nat. Crust. et Ins. from Bosc.

Cancellus marinus minimus quadratus, Sloane's Jam. vol. 2. tab. 245, fig. 1.

Thorax cinereous, varied with brown, anterior angles acute, with a sinus behind them on the edge, between the eyes are two impressed, abbreviated lines; *clypeus* entire, hardly undulated at tip; third joint of the anterior feet serrate on the inner edge, at the tip four-toothed; *carpus* with an obtuse tooth within; *hands* rather large, granulate beneath; *fingers* dentate within, teeth conspicuous: all the remaining feet, except the last, dentate at the hind tip of the third joint, that of the second pair with a much larger tooth; all rugose above, and, with the exception also of the posterior pair, armed with two moveable, short spines, at the tip of the third joint, which are separated by an impressed line, which is obsolete on the last pair; *eyes* sanguineous. Length two fifths of an inch.

Taken by captain Hamilton in the Gulf-Stream, and by him presented to the Academy. Sloane, in his history of Jamaica, calls it *Cancellus marinus minimus quadratus*, and observes that it is found on *Sargaso* and other sea plants. We also learn that Columbus, in his celebrated voyage which discovered the West Indies to the civilized

world, concluded that he was approaching land, in consequence of finding this animal alive on some floating marine plants. To a specimen under examination a *Spirorbis* is attached.

Genus PLAGUSIA. Latr.

Thorax a little narrowed before; *anterior feet* short; *mouth* nearly closed; *Intermediate antennæ* reflected into two profound longitudinal fissures of the front, which divide the clypeus above.

SPECIES.

P. depressus. *Thorax* leprous, three-toothed on each side; *carpus* with an impressed line above, and prominent, emarginate, angle within.

Inhabits Gulf-Stream.

Grapsus depressus—Latr. Gen. Crust. et Ins.

Cancer depressus of Authors.

Cabinet of the Academy.

Thorax with numerous distant punctures, and exhibiting the appearance of being covered with scales, each of which is bounded before by a line of impressed points, furnishing hairs; *dorsal foraminae** rather large, oval, transverse, open; *mouth* closed; recipient grooves of the interior antennæ, terminating nearly in a line with the hind margin of the orbits, separating the clypeus into three parts, of which the intermediate division is largest, emarginate at tip,

* Not knowing what term has been made use of by Naturalists to express these parts, I have applied this for the present; they consist of two small apertures situate near each other, transversely, about the middle of the thorax, just before the abbreviated transverse line; they might furnish characters, drawn from their form and relative position; they are sometimes parallel, sometimes oblique, round, oval, &c.

with an elevated margin, longitudinal impressed line on the middle, and two small tubercles above; lateral divisions less than half as large as the preceding, margin suddenly raised behind the exterior antennæ; *exterior antennæ* with the first joint dilated before near the tip; three serrate teeth each side of the thorax, hind one smallest and placed about the middle, second and third equidistant and proportionally larger, the posterior canthus of the eye elevated into a tooth, with a small tubercle within its base; *coxæ* with two elevated, somewhat comose, scales, of which the anterior one is acute, obsolete on the four anterior feet, and the posterior one obtuse; *carpus* with a depressed spine within, which is emarginate at tip, above with distant, small tubercles, and a double, darker, impressed, submarginal line above, interrupted behind; *hands* granulate, above with small tubercles, and two impressed lines; *fingers* deflected, with obtuse teeth, tip flattened and brown within; remaining feet with two ciliate lines, second joint of the tibia with three; *tarsi* with but one ciliate line, and a double line of moveable spines beneath; tip of the preceding joint about five-spined beneath; spine, near the tip of the thighs, large; colour variegated, tibia darker, spotted; beneath white immaculate.

The very peculiar situation of the intermediate antennæ, in longitudinal recipient grooves, together with the closed mouth, &c., certainly justifies the separation of this, and its neighbouring species, from the genus to which it has hitherto been referred. I have here described it, that it may be compared with its analogue of the Mediterranean, which is most probably distinct.

Taken in the Gulf-Stream, and presented by Captain Bartling.

(To be continued.)

A new genus of Fishes, of the order Abdominales, proposed, under the name of Catostomus; and the characters of this genus, with those of its species, indicated. By C. A. Le Sueur. Read September 16, 1817.

(Concluded.)

7. *C. longirostrum.* *Dorsal fin* deeper than broad, quadrangular; the extremity of the *anal fin* does not reach the base of the *caudal fin*; *head* horizontal, terminated in a long snout

Body subcylindric, strait, delicate; *head* flat; *eyes* large, *irides* yellowish white; aperture of the mouth greatly arcuated, and large; *scales* very small and roundish; colour of the *body* above reddish, paler on the *sides*; *abdomen* white, with a bluish tint; the *lateral line* is curved above the *pectoral fin*. Length of individual described five inches.

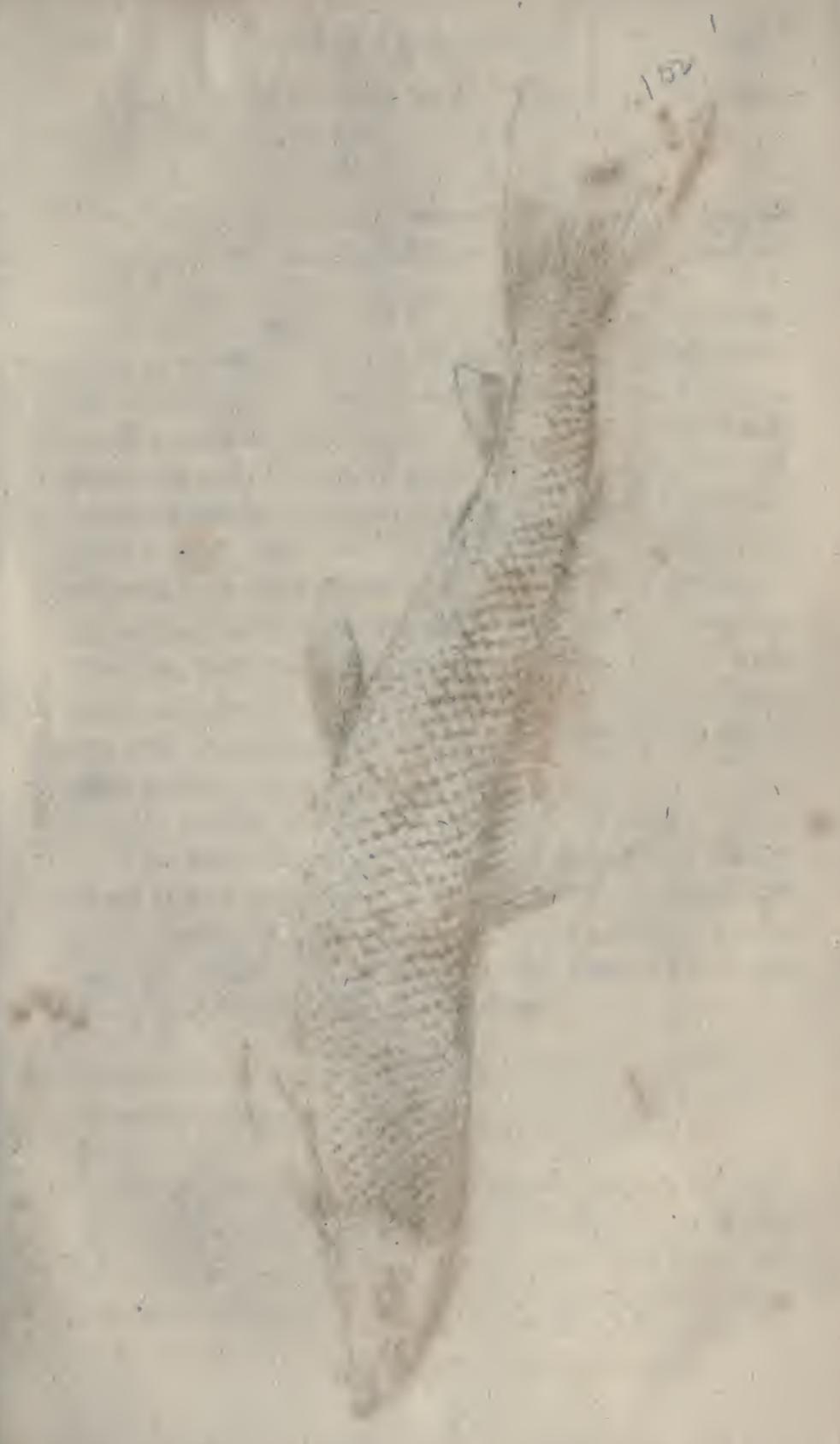
P. 16.—D. 12.—V. 9.—A. 7.—C. 18 rays.

This fish I discovered in the state of Vermont; I have not seen it in any other state.

8. *C. nigricans.* *Head* large, quadrangular; *anal fin* strait, its extremity reaching the base of the *caudal fin*; *eyes* oblong: the *lateral line* runs in a straight course from the branchial opening, below the range of the eye, to the tail.

Body subquadrangular near the head; *tail* strait, short; *caudal fin* forked, with pointed lobes; *dorsal fin* quadrangular, and small; *scales* roundish; colour of the *back* blackish, *sides* and *abdomen* reddish yellow, with dusky blotches; *pectoral*, *abdominal*, and *anal fins* reddish; *caudal fin*

102





C. H. LEADER. Sc. & F. Scop.

C. H. LEADER. Sc. & F. Scop.

and *dorsal fin* dashed with black. Length of specimen described thirteen inches.

P. 18.—D. 11.—V. 9.—A. 8.—C. 18 rays.

I discovered this new species in Lake Erie, where it is known by the names of Black Sucker, and *shoemaker*.

9. *C. maculosus*. *Head* large, quadrangular, declivous; *eyes* small, roundish; the *lateral line* is straight, and runs from the operculum in a line with the eye.

The *head* in this species is more pointed, the anterior part of the body thicker, the posterior part straiter, the *tail* longer, the *dorsal fin* larger, and more elongated, than those parts of the *C. nigricans*; the *caudal fin* is also larger, but the *anal fin* is shorter, than in the last; the *scales* are roundish; colour of the *body* reddish, with irregular blotches of black; *pectoral* and *ventral fins* reddish, dashed with black; *anal fin* and *caudal fin* reddish white; *dorsal fin* bluish, with black marks on the rays. Length of specimen eight inches.

P. 16.—D. 12.—V. 9.—A. 9.—C. 18 rays.

This fish is likewise called Black Sucker. I discovered it in Pipe-Creek, Maryland. Perhaps it may be only a variety of the *C. nigricans*; but as there is a considerable difference observable between them, I have ventured to arrange it as a distinct species.

10. *C. elongatus*. *Body* subcylindric, very long; *dorsal fin* very long, low, its anterior part high, and falciform.

Head very small, cuneiform above, breadth between the eyes one inch and a half; *snout* strait, round, and furnished, as are likewise the *opercula*, with small tubercles; *pectoral fins* as long as the *head*, placed very low; *abdo-*

minal fins almost as long as the pectoral; *anal fin* very small and truncated; *caudal fin* large and bifurcated, with pointed lobes; the *dorsal fin* is about one third the length of the whole animal; *scales* large, flexible on the flanks, and a little quadrangular towards the tail; *lateral line* almost straight; the skin beneath the great rays of the pectoral fins is callous.

In an individual of two feet long, the head measured three inches to the tip of the snout. The colour of the specimen described could not be ascertained, in consequence of its being in a dried state: it forms a part of the collection of the Academy of Natural Sciences of Philadelphia.

P. 16.—V. 10.—D. 32.—A. 8.—C. 18 rays.

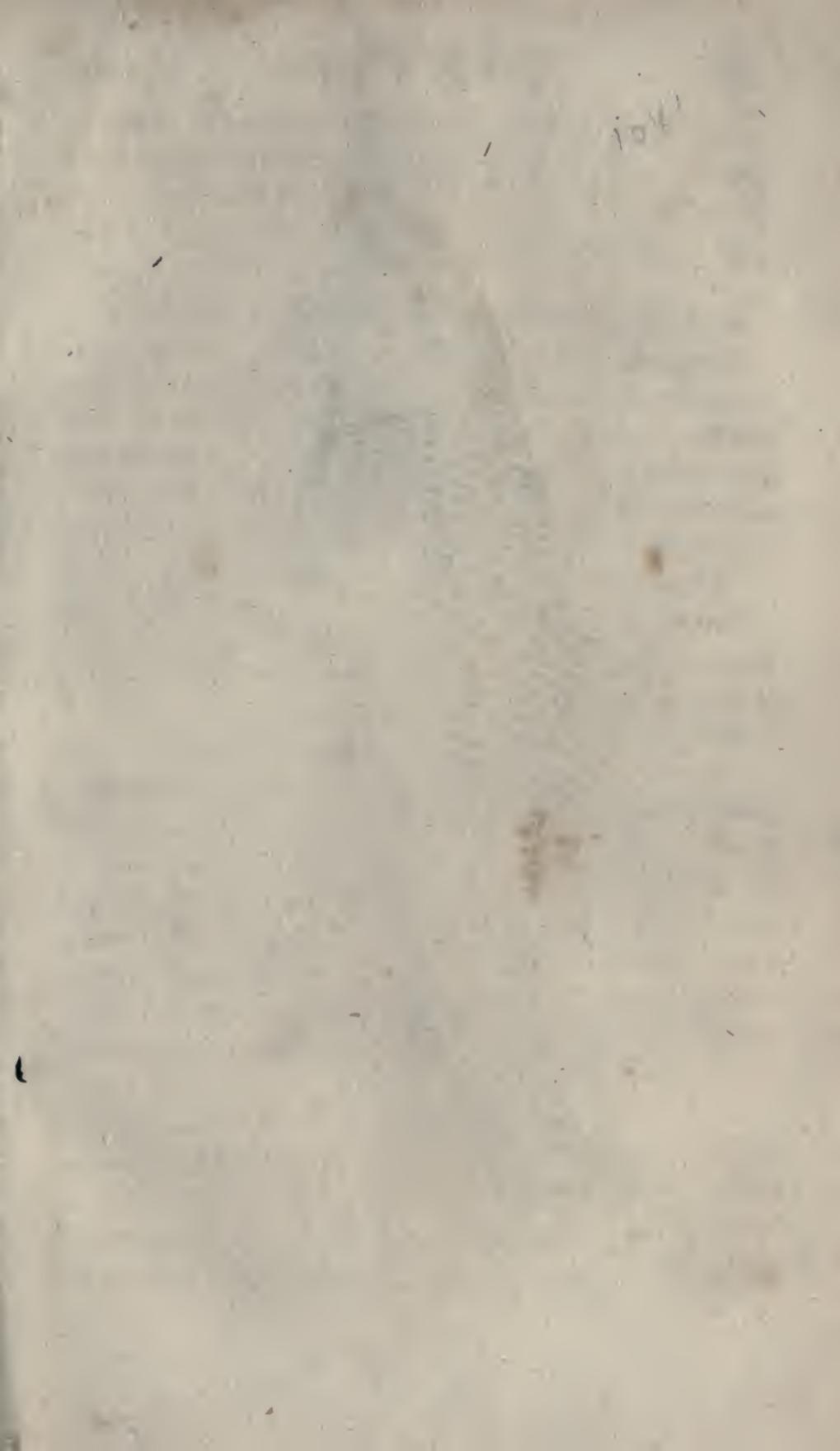
With the exception of the *C. Cyprinus*, this is the largest species that I have seen. It was discovered in the river Ohio, by Mr. Thomas Say.

11. *C. vittatus*. A black stripe passes from the snout, through the eye, to the caudal fin, dividing the body equally; *dorsal fin* quadrangular; *tail* forked.

Body very small, slightly compressed, elevated in the centre above; *back* pale yellowish red, *abdomen* and *lower fins* white; *mouth* small, lower *lip* very easily protruded forward, as if by means of a spring, when the animal takes its food; *scales* very small, rounded. Length of specimen two inches.

P. 16.—D. V. 9.—A. 8.—C. 18 rays.

This remarkable little species was found in Wissahickon Creek, near Philadelphia, by Reuben Haines, corresponding Secretary of the Academy of Natural Sciences.





C. DUQUESNII

12. C. *Duquesnii*. *Head* large and long; *mouth* wide; *scales* large, subtrilobate: *dorsal fin* quadrangular; the *anal fin* extends as far as the base of the *caudal fin*, which is greatly forked; *lateral line* arched at the centre of the body.

Body long, a little compressed: *snout* strong; the *mouth* is furnished with thick, plaited, and very large lips; *pectoral fins* pretty large; the *scales* are strong, greatly radiated, and as wide again as long—they are of nearly an equal size on the whole body; the *lateral line* forms a long curvature towards the back; lobes of the *caudal fin* pointed, the upper lobe somewhat the largest; *length* from the snout to the extremity of the caudal fin nineteen inches; *depth* three inches and a half; *thickness* two inches; the *head* measures about one fifth part of the whole fish.

P. 17.—D. 14.—V. 10.—A. 9.—C. $18\frac{1}{4}$ rays.

This new species is so strongly marked that it will be easily distinguished from the foregoing.

It inhabits the Ohio; and was discovered at Pittsburg, the ancient Fort Duquesne, by Mr. Thomas Say.

It was not until the publication of the first part of this Monograph, that I noticed the above described specimen in the collection of the Academy of Natural Sciences of Philadelphia.

Of the above twelve species, and likewise of the *Bostoniensis*, I have drawings; and part of them are already engraved for my projected work on the Fishes of the United States of America. But in order to facilitate a comparison of those species described by others with mine, and chiefly to incite to a re-examination of the subjects themselves, I have concluded to append to this paper the descriptions which follow. The reader by this means will

have at one view before him all the American* species, hitherto ascertained, of this new genus. Hence my paper assumes the character of a *Monograph* of the genus *Catostomus* of North America.

13. *C. Bostoniensis*. *Caudal fin* greatly forked, lobes equal and pointed; *mouth* very small, lunated; the *lateral line* proceeds, with a regular curve, from the nape to the tail.

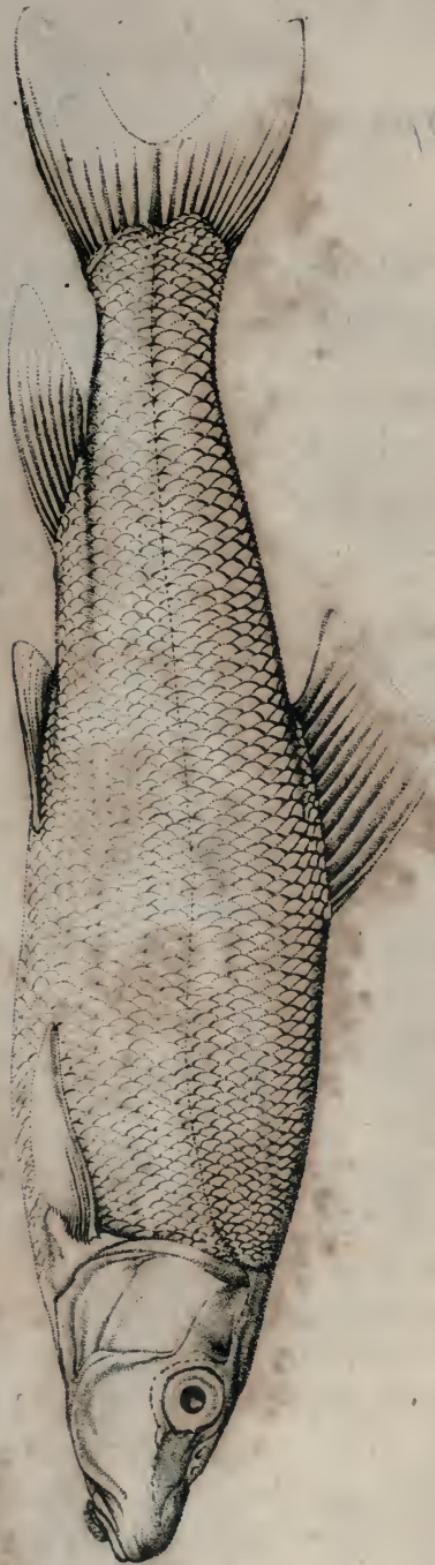
This species has a great resemblance to the common sucker of the Delaware, *C. communis*, in the form of its body, but it is somewhat shorter; and its very forked tail, with equal lobes, distinguishes it from that species; the *scales* are round, equal, and smallish on the back, near the nape; the *back* is of a reddish brown colour, (in some specimens darker than in others) as is likewise the *head*; the *sides* and *abdomen* are whitish; *pectoral*, *ventral*, and *anal fins* of a reddish yellow colour; *eyes* large, roundish, and placed about midway between the posterior part of the gill-covers, and the end of the snout; the *anal fin* is pointed, and runs to the base of the *caudal fin*.

P. 18.—D. 13.—V. 10.—A. 9.—C. 18 rays.

This fish inhabits the waters of Massachusetts, in the neighbourhood of Boston. I obtained my specimen in the Boston market.

On mature reflection, I have concluded that this is the species described and figured by Peck, as before stated, though this author is censurable for intermingling Forster's description with his own. But I cannot join Mr. Peck in

* I say American, for it is doubtful whether two or three foreign species may not be classed with this genus.



C. A. Deacon Del. 1801. by George

O. BOSTONIENSIS.



the determination of the identity of the *catostomus* and his Piscataqua fish.

14. C. *Hudsonius*. Cyprinus Catostomus. Pinna ani radiis 8; labio imo caruncula bilobata papillosa, cauda bifida.

Pinnæ D. 12.—P. 17—V. 10—11.—A. 8.—C. 17.

Habitat in Sinus Hudsonis fluminibus copiose, sugendo pascitur.

Anglis the *Sucker*. Royal Society Trans. vol. 63, page 155, tab. 6.

Head broader than the body, gradually decreasing towards the nose, full of elevations and tubercles, nearly quadrangular; *mouth* not far from the extremity of the snout; *eyes* large; on the *snout* are about five round prominent tubercles; the *head* has several sutures; over each eye, in a cavity, are two longitudinal sutures, joined opposite the nostrils by a still shorter transverse one; on the covers of the gills are two, on each side one, beginning near the lobes of the caruncula of the under lip, and going up arched towards the eye. Near the extremity of the snout begins on each side a longitudinal one; it passes under the eye, and mounts in a curvature behind it, then it goes straight to the end of the head, where it again gets downwards, and joins the lateral line; the *scales* are small near the head and back, increasing in size towards the middle and tail, close to which they are again smaller; *dorsal fin* rhomboidal; *pectoral fins* lanceolated, fixed under the covers of the gills, and measure in length a fourth part of the fish, estimated from the setting on of the head to the base of the caudal fin; body pale silvery; *caudal fin* concave or lunated. Length sixteen inches.

Weighs about two pounds and a half. Not deemed a palatable food.

This is the description of the first species, which was made known to naturalists, of the present genus; extracted from the sixty-third volume of the Transactions of the Royal Society of London. I have never yet seen a fish to which Forster's description would apply; and I do not hesitate to assert that this species is distinct from all those recorded in this Monograph. It possesses a remarkable character in its long pectoral fins, which are longer than those of any of my species, with the exception of the *elongatus* of the Ohio.

15. *C. teres*. Fresh-water Sucker. (*Cyprinus teres*.) With elongated round body. Low, soft, puckered mouth, and tail nearly even.

Mouth under, toothless, and with a soft and puckered orifice. Head rather small. Back thick and round, (*cylindrically*.) Back and sides a speckled black and white. Belly whitish. Pectoral, abdominal, and anal fins yellowish. Dorsal and caudal dark brown.

Lateral line straight. Abdomen large and frequently flabby. Rays of the fins coarse. Tail almost even.

Inhabits fresh brooks, ponds, and rivers, and in many of them is taken very abundantly. Grows to the size of twelve and fifteen inches. Is, perhaps, the *C. catostomus*.

The swimming bladder is divided into two sacks or cells, having connection by a small tube.

P. 17.—V. 9.—A. 8.—D. 13.—C. 19 rays.

16. *C. oblongus*. Chub of Newyork. (*Cyprinus oblongus*.) Mouth under, small, puckered, and toothless.

Head somewhat depressed and smooth. Eyes rather small. Gill-openings rather narrow. Pectoral fins very far forward on the neck. Back arched, and approaching to gibbous. Body thick, but may be rather termed deep than round.

Back deep brown, inclining to black, with whitish scales. The lines between the scales, dark and decussating each other so as to leave rhombic spaces between them. The lines are darker coloured than the spaces they define.

Belly a pale cream colour, with golden spots or tints, particularly between the pectoral and ventral fins, and near the anal.

Pectoral and ventral fins dusky, with a reddish tinge, anal, caudal, and dorsal, dark brown.

Lateral line obscure. Tail rather concave.

P. 15.—V. 9.—D. 14.—A. 8.—C. 19 rays.

Lives in fresh streams and lakes, like the Sucker.

These two last descriptions are extracted from an account of the Fishes of Newyork, by Samuel L. Mitchill, M. D., published in the Transactions of the Literary and Philosophical Society of Newyork, 1815.

17. *C. suetta*. (*Cyprinus suetta*. La Cépède.)
Head compressed and flat; the opening of the *mouth* semi-circular; lower *lip* very thick, crenated, and curved outwardly; *body* and *tail* compressed; *scales* semirhomboidal; *irides* yellow; *fins* and *back* of a brown colour; *sides* silvery, with brown spots at the base of the scales.

P. 13.—D. 12.—V. 9.—A. 9.—C. 18 rays.

In the introduction to this article, I asserted that the *C. catostomus* is the only (certain) species of the kind

recorded by La Cépède. On a review of the extensive and valuable work of this celebrated author, to whom science is so much indebted, I have found that I was in error, and I hasten to publish my acknowledgment. The description of the *C. suetta* was taken from the manuscripts of Monsieur Bosc, formerly Consul of France at Charleston, South Carolina. This species is said to be very common in the rivers of South Carolina; it seldom arrives to the length of four *décimètres*, or about two feet; and it is not an esteemed food.

ADDENDA.

In the cabinet of the Academy of Natural Sciences, there is a specimen of *Catostomus* which approaches in its form to the *C. Cyprinus* of the Chesapeake. It differs from the last mentioned in its *gill-covers*, which are stronger; in its *back*, which is a little less elevated; in its *dorsal fin*, the two first rays of which are longer than the total length of the fin, and extend as far as the base of the caudal fin.

This individual resembles in its other parts, and also in the number of the rays of its fins, the Chesapeake species. According to the observation of Mr. T. Say, who discovered this fish in the Ohio, and who examined and prepared two recent specimens, the colour was the same as that of the *C. Cyprinus*.

The difference, noted above, which exists between the Catostomi in question, does not appear sufficient to authorize me to record them as distinct species, though I must admit that the uncommon length of the first rays of the dorsal fin, of the Ohio fish, if universal, would suggest a specific discrimination. They certainly have a

very close affinity to each other; both are accounted good food; and attain to about the same size.

In the early part of the present month, I procured several individuals of the *C. macrolepidotus*, in the markets of Philadelphia; they had not the dorsal fin hollowed, but it was raised in a point before, and truncated in a very oblique line, which diminished the fin towards its posterior part. One of these specimens was a male, and it did not differ in other respects from the specimen described, No. 4 of this article, which I omitted to mention was a female. This additional notice is necessary, in order to put the naturalist on his guard when he turns his observation on this species.

An account of two new genera of Plants, and of a species of TILLÆA and LIMOSELLA, recently discovered on the banks of the Delaware, in the vicinity of Philadelphia.
By Thomas Nuttall. Read September 16, 1817.

In July last, while collecting specimens, near Kensington, of the *Isoctes lacustris* which grows so abundantly on the mirey and gravelly banks of the Delaware, subjected to the flowing of the tide, I happened, almost inadvertently, to discover a very small succulent plant, somewhat resembling a *Sedum*, which on examination, proved to be a species of *Tillæa*. I at first, as well as my friend Mr. Collins, supposed it to be the *T. connata* of the Flora Peruviana, but on examining the plate, and description in that

work, we were soon assured of its distinction; the same ambiguity respecting this plant, and the *T. aquatica* of Europe, I have not been able to solve with equal satisfaction; but as the *T. aquatica* and *T. prostrata*, are considered the same species; after an illustration by Schkuhr, in Usteri's Annals of Botany, (vol. 2. plate 3,) we are inclined to believe the American plant a distinct species.

Nearly in the same moment of finding the *Tillæa* appeared a second unnoticed plant, in this very peculiar soil and situation, and still more minute than the first; it was a species of *Limosella*, and so nearly related to the *L. tenuifolia* of Germany, as to admit of no specific distinction, deciding at the same time without either plate or specimen. In general habit, however, it approaches so near to what we have seen of the *L. aquatica* as to leave but little doubt of its affinity to that species, of which the *L. tenuifolia* is considered by Persoon only a variety, but in America no other plant than this supposed variety has yet been discovered.

Amongst the numerous specimens of *Tillæa* that I had collected, appeared something which I supposed to be creeping shoots of that plant; I did not in consequence take any further notice of it, but revisiting the place a day or two after, I met with this plant in exclusive masses, and in such abundance as instantly to convince me of its distinction from the *Tillæa*. It is perhaps the minutest phænogamous plant in North America, if we except the *Lithophila muscoides* of the West Indies, to which it also bears some affinity. Greatly as it differs from the genus *Peplis*, I have been led to suppose that it might be the *P. Americana* of Mr. Pursh; but it belongs neither to the same class nor order in any existing system of Botany.

Its affinity to *Montia* arranges it with the PORTULACEÆ of Jussieu, rather than the CARYOPHILLEÆ, to which order it has at the same time considerable relation, as will be seen in the description. It bears a flower which never expands, and of such extreme minuteness, as to require the assistance of a common lens to ascertain its existence; it appears to be constantly restrained in its functions (as in the Orobanche Virginiana, &c.) by the rapid enlargement of the ovary. How well it is at the same time calculated to withstand the action of the element in which it is periodically immersed must be sufficiently evident. To this plant, from the singular concealment of its inflorescence, I have attempted to apply a name (*Crypta*) expressive of this circumstance.

Revisiting this interesting spot in company with professor Barton, we at the same instant detected another minute phænogamous plant, of which I had the preceding day obtained a single specimen destitute of flowers. Its affinity to the *Micranthemum* of Michaux is such, that it is only after a comparative analysis of the plants themselves that I have been induced to consider them as generically distinct. This plant, like the preceding, and equally subaquatic, has likewise a flower very singularly constructed to withstand the submersion of the tide. The corolla, which is monopetalous and irregular, consists apparently only of an under lip, almost after the manner of *Teucrium*, but divided only into three parts; the central portion is ligulâte, and apparently to obviate the minuteness of the upper lip, and to shelter the interior of the flower, it is constantly incurved, with the extremity generally retained in the tube, the spreading of the two lateral dentures affording as much light and air, aided by

the white colour of the corolla, as seems necessary for the purposes of the flower. In consideration of this singular structure, I propose to call this plant *Hemianthus*, derived from two Greek words *ἡμιστός*, half, and *ἄνθος*, a flower; the corolla being halved, or consisting, as it were, of a single lip.

I shall now proceed to describe these plants in the order in which they were discovered.

Linnæan CLASS and ORDER.

TETRANDRIA.—TETRAGYNIA.

Natural Order. SEMPERIVÆ—Jussieu.

Genus TILLÆA.

T. *simplex*, caule erecto, simplici; foliis connatis, oblongo-linearibus, acutiusculis; florib; alternis, sessilibus; petalis erectis, calyce duplo longioribus.

Description.—Annual. Stem generally simple, erect and terete, (2 or 3 inches high) sometimes decumbent near the base, and sending out whitish radical fibres, tinged with red, similar to the proper root. Leaves connate, succulent, convex on the under side, fragile, very entire, and without visible nerves or veins (3 or 4 lines long, and about a line wide.) Flowers sessile, axillary, solitary, and alternate. Calyx four-toothed, segments alternating with the petals, two of the exterior dentures somewhat larger and obtuse. Petals four, ovate, erect, and persistent, never apparently expanding, whitish and membranaceous, embracing the capsules with which they

are almost exactly equal in length. *Stamina* four, fertile, alternating with the petals, a little shorter than the germs; *anthers* very small, roundish; four minute infertile filaments opposite the petals. *Styles* none. *Stigmata* four, like so many minute points. *Capsules* four, oblong, compressed, somewhat divergent at the points, six to eight seeded, opening internally and longitudinally, remaining connected at the base, so as to resemble a single capsule of four valves. *Seeds* oblong-cylindric, brownish, attached in two rows to the margins of each capsule.

Habitat.—On the miry and gravelly banks of the Delaware, subject to the overflowings of the tide, in New-jersey and Pennsylvania, near Kensington, in the suburbs of Philadelphia. Found also more recently near Newhaven, in Connecticut, by Dr. Ives. Time of flowering from July to September.

DIDYNAMIA.—ANGIOSPERMIA.

Natural Order. PRIMULACEÆ.

Genus LIMOSELLA.

L. tenuifolia, foliis linearibus, vix apice dilatatis, scapis foliis æqualibus, brevioribus. WOLF. Hoffman's Flora Germanica, vol. ii. p. 29.

In locis humidis. (Minutissima, vix uncialis plantula, folia angustissima. Calyx 5-fidus. Stamina 4.) Flor. Aug.—HOFFMAN.

L. aquatica. varietas *tenuifolia*. Persoon's Synopsis, ii. p. 167.

Description.—Root surculose. Leaves radical, succu-

lent and somewhat fragile, erect, subcylindric-filiform, a little compressed and obtuse towards the point, membranaceous sheathing and radicant at the base, radical fibres white, compressed, and flaccid. Scapes or peduncles shorter than the leaves, one-flowered, radical, axillary, terete, at first erect, in fruit deflected. *Calyx* cylindric-campanulate, border four and five-toothed, dentures acute. *Corolla* monopetalous, tubular, white, shaded with grayish blue outside, tube yellowish and glandular within, border spreading four and five-lobed, lobes oblong-oval, or oval, obtuse. *Stamina* four, approximating by pairs, included in the tube of the corolla. filaments short; anthers pale blue, two-celled. *Style* included, stigma capitate. *Capsule* nearly spherical, smooth, bursting the calyx, bivalve, subbilocular, many-seeded. *Seeds* numerous, angular, somewhat gibbous, attached to a large and rounded receptacle, compressed at its base, and dilated on two sides, producing imperfect dissepiments, which are continued to the margin of the valves, hence the capsule is bilocular near its base, and only one-celled above.

Does this plant with a lateral mode of growth and alternate leaves, germinate with two cotyledones?

Habitat.—With the above, also in Connecticut;—Dr. Ives, in a letter to Z. Collins, Esq. with the preceding. Flowering from July to September.

DIANDRIA.—DIGYNIA.

Natural Order. PORTULACEÆ. Allied to Montia.

*Genus *CRYPTA.†*

Calyx diphyllos inferis. *Corolla* 2 aut 3-petala, arcte incumbens, clausa. *Styli* nulli; stigmata 2 aut 3 minutissima, punctiformia. *Capsula* 2 aut 3 valvis, 2 aut 3-locularis, loculis 4 ad 5-spermis. *Semina* subcylindracea incurva, longitudinaliter striato-punctata.

Herbula paludosa, minima, succulenta. Folia opposita, integra, stipulacea. Flores minuti, sessiles, alterni, inaperti.

C. minima.

Description.—Plant smooth and succulent. *Root* fibrous. *Stem* numerously and dichotomously branched, decumbent, radicant, thick, and cylindric, marked with about six to eight vertical lines, internally divided into as many compartments, with the dissepiments diverging from a common filiform axis; branches assurgent. *Leaves* cuneate-oval, or obovate, opposite, sessile, entire, and lucid, marked on the upper surface with elevated pappillose punctures, (visible only through a lens) furnished with but a single visible nerve, bistipulate at the base; stipules membranaceous and acuminate. *Flowers* axillary, solitary, sessile, and alternate, extremely minute, rapidly displaced by the enlargement of the germ. *Calyx* two-leaved, leaves oblong-oval each usually terminated by a brownish sphacelate point. *Corolla*

† From *κρύπτω*, I hide, or conceal.

of two and sometimes three petals, never appearing to expand. *Petals* oval, concave, closely incumbent over each other, whitish, somewhat rosaceous and subdiaphanous or membranaceous, closely covering the stamens. *Stamina* two, sometimes three; seated upon the base of the petals; filaments incumbent on the germ, and about the same length; *anthers* roundish, two-celled, colour somewhat rosaceous. *Styles* none. *Stigmata* two, or three, like so many minute points, which are only visible through a strong lens. *Germ* turbinate. *Capsule* naked, globular and depressed, subturbinate, umbilicate, membranaceous, two or three valved, two or three celled; cells four or five seeded; seeds attached to a small basilar and common receptacle, marked with excavated punctures; disseminants very thin, arising from the receptacle, and unconnected with the valves. *Seed* cylindric, the whole length of the capsule, obtuse at either extremity, the base furnished with a minute funiculus, the point incurved, longitudinally marked with about ten striæ, and traversed by rows of impressed punctures; episperm brown and fragile. *Perisperm* none. *Embryon* erect, flat; radicle cylindric, large, descendent. *Cotyledones* two, small, subovate.

Probably *Peplis Americana* of Mr. Pursh, *Flor. Am: Septent.* vol. i. p. 238?

The flower never appears to open, and is with so much difficulty developed, artificially, as to seem to most observers destitute of stamens. This plant possesses considerable affinity with the *Caryophylleæ*, but differs in the insertion of the stamens; and more materially in the structure of the seed, which does not, also, altogether agree with that of the *Portulaceæ*, its singular integument, how-

ever, is so very similar to that of *Portulaca* as well as to *Montia*, though destitute of a distinct perisperm, in connection with other characters, as to leave scarcely any doubt of the propriety of arranging it with the *Portulaceæ* of Jussieu.

Hab. On the gravelly banks of the Delaware overflowed by the tide, in Pennsylvania and New Jersey; also discovered in Connecticut by Dr. Ives.

DIANDRIA.—MONOCYNIA.

Natural Order. LYSIMACHIEÆ. (*ANAGALLIDEÆ.)

*HEMIANTHUS.†

Calyx tubulosus, apice quadridentatus, deorsum fissus. *Corolla* monopetala, labiata, labio superiore obsoleto; inferiore tripartito, lacinia intermedia longiore, arcte incurva, apice truncata. *Stamina*, filamentis bifidis, stipiti laterali antherifero. *Stylus* bifidus. *Capsula* unilocularis, bivalvis, polysperma. *Semina* nitida, ovata.

Herbula paludosa, repens; folia integra opposita et verticillata; flores alterni pedicellati minimi.

H. *Micranthemoides*.

Description.—Root fibrous, annual. Stem dichotomous, filiform, repent, crowded with leaves. Leaves sessile, subelliptic, or oblong-elliptic, entire, opposite and ternate, obsoletely three-nerved, rather succulent, smooth, and of a light green. Flowers axillary, solitary, alternate, erect while flowering, deflected in fruit; peduncle very short. *Calyx* oblong, and

† From *μειστος*, half, and *αρθος*, a flower.

tubular, somewhat compressed, attenuated towards the peduncle, cleft on the under side, border four-toothed, dentures obtuse, and very short. *Corolla* monopetalous, bilabiate, tube gibbous, upper lip obsolete, minute, and truncate, (not visible without a lens;) lower lip three-parted, rarely expanding, (apparently only after perfect inflorescence) the two lateral segments dentiform, the central segment elongated, linear-ligulate, truncate, and crenate at the apex, curved inwards in an arch, the point remaining mostly within the tube of the corolla, (apparently to protect the parts of fructification from the admission of the water in which the plant is periodically immersed, the two lateral dentures then diverging so as to admit sufficient light and air for the functions of the flower.) *Stamina*, seated upon the lower lip, filaments bifid, the lateral stipes bearing the anthers; *anthers* somewhat obcordate, two-lobed, two-celled. *Style* one, declinate, bifid half way down; stigmata small, capitate. *Capsule* round, one celled, many-seeded, two-valved, receptacle large and globular with impressed favulose punctures. *Seeds* ovate, shining, perfectly smooth, acute at the base.

Habitat.—On the gravelly banks of the Delaware, overflowed by the tide, near Kensington, with the above; flowering from August to the close of September. Flowers white, scarcely a line long, the plant, which is creeping, seldom more than one or two inches high.

May this be the *Herpestis micrantha* of Pursh, vol. ii. p. 418? Certainly not *Gratiola repens* of Swartz, which he quotes as a synonym.

It is in consideration of the proximate affinity of this

plant to the genus *Micranthemum*, that I have been induced to place it in the natural order LYSIMACHIAE of Jussieu, to which it decidedly belongs, notwithstanding the singular irregularity of the corolla. From *Micranthemum* it differs materially in several circumstances; in that genus the calyx is divided down to the base into four spathulate laciniae, the corolla is somewhat campanulate with a four-lobed border, the segments nearly equal; the stamens, however, as in *Hemianthus*, seated upon the lower segment of the corolla; the appendage also described as existing at the base of the filaments, is, in fact, the rudiments of an infertile stipe in the form of a minute lateral denture. In *Micranthemum* the style and stigma is simple, or, with the capitulum, merely bilobed; the capsule is membranaceous and somewhat inflated, the seminal receptacle small; the seeds also oblong and four-sided, marked with four longitudinal furrows, and transversely striated. Nearly the whole of these remarks are so many lines of distinction which separate *Micranthemum* from *Hemianthus*. In *Lindernia*, to which this genus is indeed very distantly allied, there exists a five-parted calyx; a distinctly bilabiated corolla, with the upper lip, however, much shorter than the lower. Stamina two fertile and two sterile, the sterile filaments bifid. Stigma bilabiate or bilammellate. In its capsule of one cell, and smooth ovate seeds, it resembles *Hemianthus*, and seems to indicate that the absence or presence of a capsular dissepiment, is not indeed of insurmountable importance in the sum of natural affinities, hence we might no doubt be justified in placing *Hemianthus* with the ANTIRRHINEAE, did not its striking affinity to *Centunculus*, and the genus with which we have more particularly compared it, for-

bid. There appears then to exist no constant limits in the *order* of nature, all its beings approximating to each other by such innumerable and minute gradations as to forbid the advantage of a compendious system. Still let us rather follow the devious footsteps of Nature, replete with instruction, than sedulously attach ourselves to the support of imperfect theories.

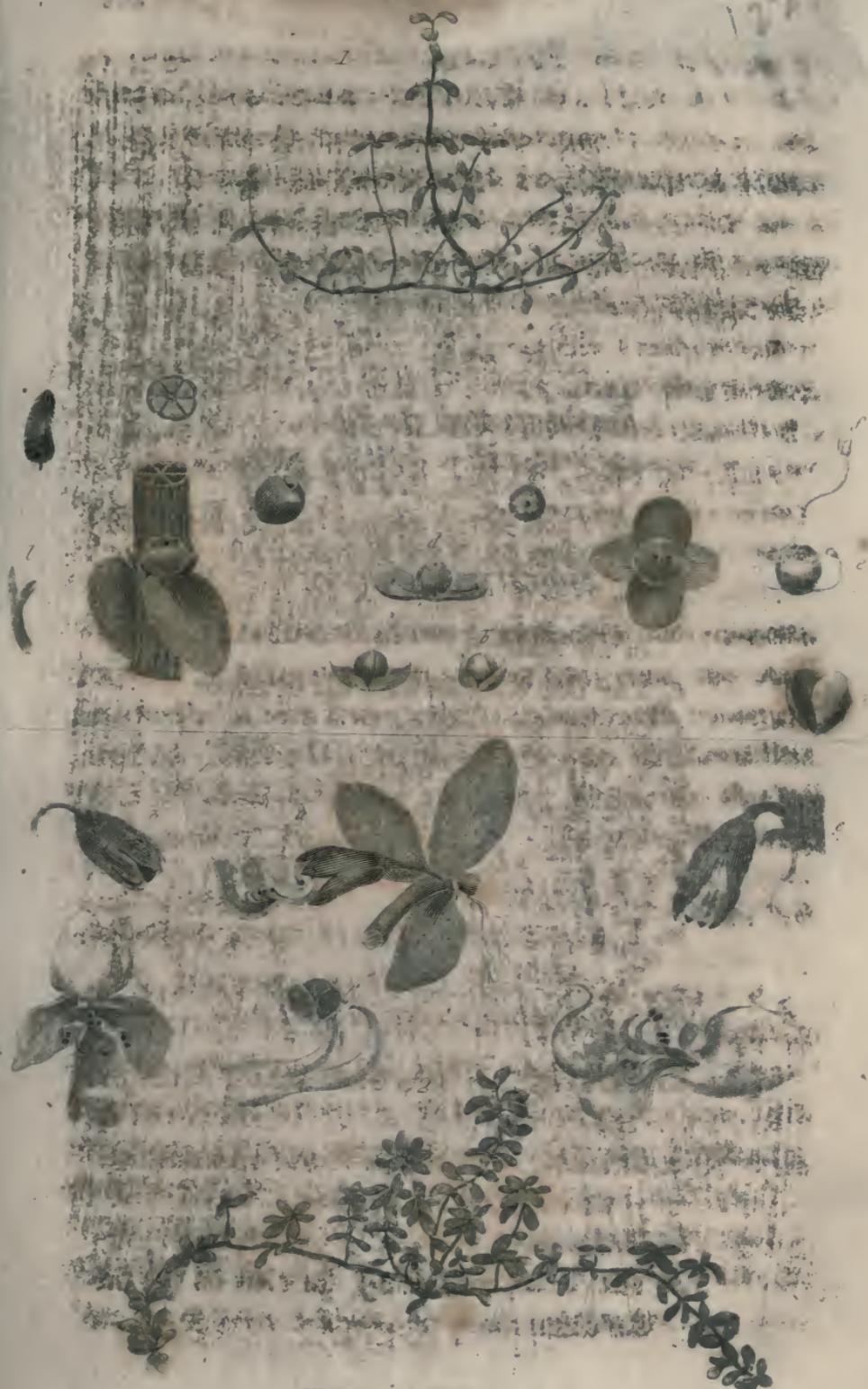
Explanation of the Plate.

Figure 1. *Cripta minima*, (natural size.)

- a. Calyx and corolla opened, (much magnified.)
- b. c. The corolla containing the capsule.
- d. The calyx opened, showing the position of the stamina.
- e. The two stamina with the ovary.
- f. One of the stamens.
- g. h. Views of the capsule.
- i. The same opening.
- k. The seed, greatly magnified.
- l. The corculum.
- m. The stem with a pair of leaves, magnified to exhibit the stipula.
- n. A transverse section of the stem.

Figure 2. *Hemianthus Micranthemooides*. (natural size.)

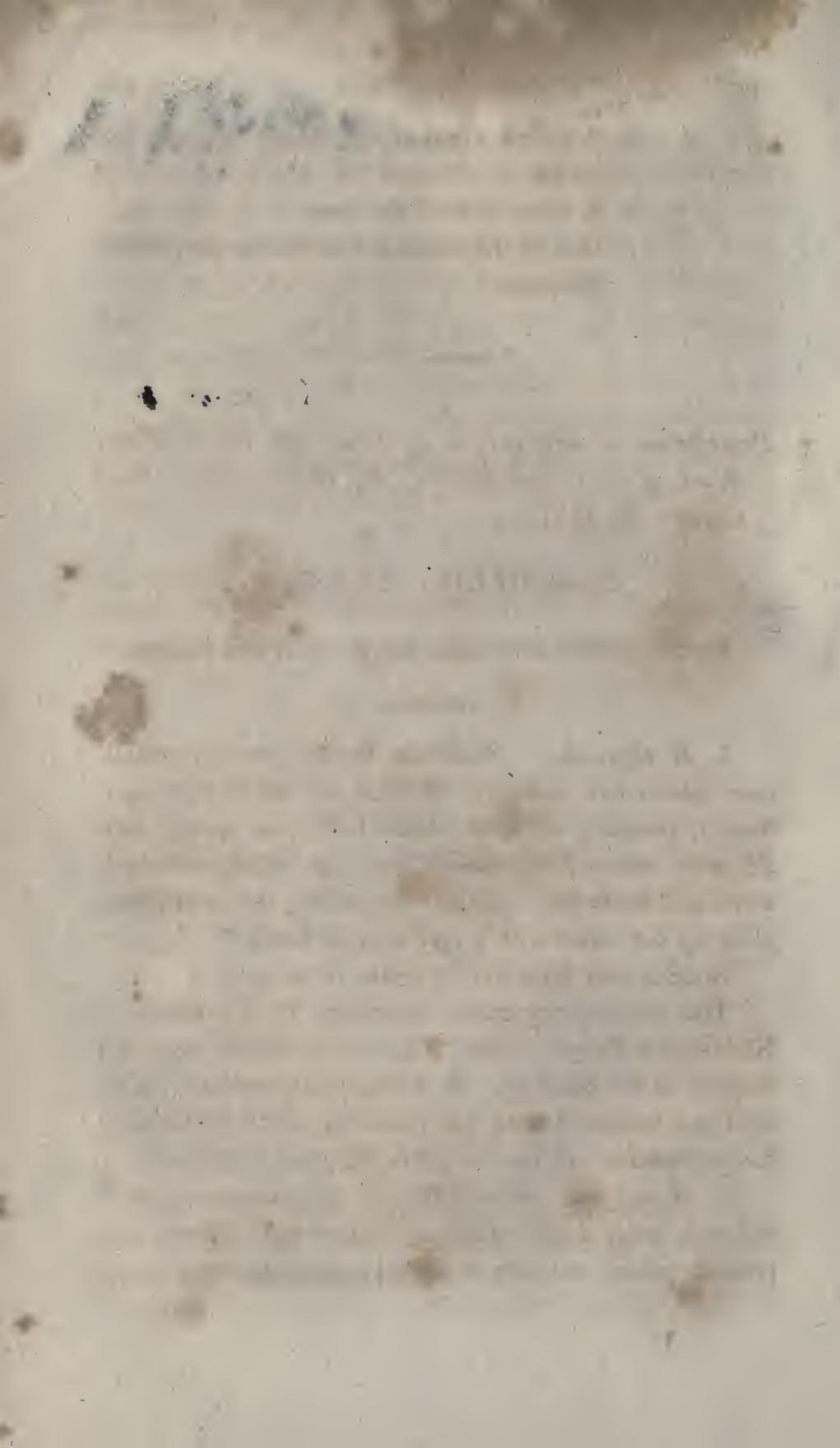
- a. A lateral view of the flower seated on the stem. (much magnified.)
- b. The calyx.
- c. The same, exhibiting the cleft on the under side.



HEMIANTHUS

C. L. Desviers Del.

Kneass, Young & Co. Sc.



- d.* A lateral view of the flower without the calyx.
 - e.* A front view of the same.
 - f.* One of the stamina exhibiting the forked filament.
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From p. 16

Descriptions of new species of Land and Fresh Water Shells of the United States. By Thomas Say. Read October 28, 1817.

Genus HELIX. Linn. Lam.

For the generic characters, see p. 17 of this volume.

SPECIES.

1. *H. thyroidus.* Shell thin, fragile, convex, umbilicate; whorls five, obtusely wrinkled, or rather with equidistant, gradually elevated, obtuse lines, and spirally striate with minute, impressed lines; lip widely reflected, white and flat before, partially concealing the umbilicus; pillar lip furnished with a very oblique tooth.

Breadth four fifths to nine tenths of an inch.

This species very much resembles *H. Albolabris* of Nicholson's Encyc. Amer. Ed. but is umbilicated, and toothed on the pillar lip. It is much less common. This shell was indicated in the American Edition of Nicholson's Encyclopædia; but its characters were not laid down.

2. *H. minuta.* Shell rather thick; spire convex, little elevated, with three volutions; suture well defined, impressed; whorls obtusely wrinkled across; aperture nearly

orbicular; *lip* much thickened, reflected, white, distant from the umbilicus; *umbilicus* large, exhibiting the volutions.

Breadth less than one tenth of an inch.

Found under the bark of a decaying oak; is readily distinguishable from other species by its small size and conspicuous lip.

3. *H. labyrinthica*. *Shell* conic, dark reddish-brown, body lighter; *whorls* five or six, with conspicuous, elevated, equidistant, obtuse lines across, forming grooves between them; *apex* obtuse; *lip* reflected, rounded; *pillar lip* with a large, lamelliform, elongated tooth, which appears to revolve within the shell parallel to the suture, a smaller raised line revolves nearer to the base within the shell, but becomes obsolete before it arrives at the pillar lip; *umbilicus* rather large.

Breadth one tenth of an inch.

Found on fungus in decaying wood; this shell is remarkable for the two, much elevated lines, which revolve within the shell upon the penultimate whorl, the upper one larger and terminating at the aperture very conspicuously, and resembling a tooth.

Genus ANCYLUS. *Geoff. Latr.*

Shell conic, not spiral, concave beneath, above with a simple apex. Animal with the eyes placed at the inner base of the tentacula.

Obs. This genus has been by writers confounded with the Patellæ. The European species are *Patella lacustris* and *fluviatilis* of Linné.

SPECIES.

A. rivularis. Shell corneous, opake, conic-depressed, apex obtuse, nearer to, and leaning towards, one side and one end; aperture oval, rather narrower at one end, entire; within milk-white.

Length one fourth of an inch.

Cabinet of the Academy.

Common, adhering to stones in rivulets: the animal resembles the inhabitant of shells of the genus *Lymnæa*, the tail is very obtuse rounded.

Genus PALUDINA. Lam. Latr.

Shell subovate, operculated; aperture entire, longitudinally ovate, narrowed above; lip simple, not dilated or reflected.

Obs. This genus has been very lately separated by Mr. Lamarck from the *Cyclostomæ*, with which it corresponds, except in having no dilated lip, and the aperture is angulated above. The animal has a short rostrum, two acute tentacula with eyes at their external base, a small membranaceous wing each side of the body before, foot double before, the wing of the right side is folded into a small canal, by which the water is introduced into the respiratory canal. Latr. To this genus will be referred several of the *Lymnæa* of the American Edition of Nicholson's Encyclopædia as *L. decisa*, *vivipara* and *subcarinata*.

SPECIES.

P. limosa. Shell conic, subumbilicate, dark horn coloured, generally incrusted with a blackish irregular

covering on the spire, and sometimes on the body, which completely obscures the obsoletely wrinkled epidermis; aperture ovate-orbicular; suture impressed.

Length three twentieths, breadth one tenth, of an inch.

Cabinet of the Academy.

Animal whitish; *head* brown; *mouth*, *tentacula*, *orbita*, and *vitta* on each side of the neck, white; *tentacula* filiform, more than half as long as the base of the animal; *rostrum* about half as long as the tentacula, annulate with darker lines above; *foot* white, brownish above, short, suboval, truncated before, and rounded behind.

Extremely numerous on the muddy shores of the rivers Delaware and Schuylkill, between high and low water marks.

Descriptions of four new species, and two varieties, of the genus Hydrargira. By C. A. Le Sueur. Read October 21, 1817.

Along the muddy shores of the fresh water streams of the United States, and in the ponds of the salt marshes of the coast, there are found small fishes, which are known under the popular names of *Mud Fishes*, and *Minows*, in consequence of their habitudes, and diminutive appearance. These fishes affect those situations which are well supplied with aquatic plants, or where old logs lie imbedded in the mud, which situations afford them shelter from danger, on the least appearance whereof they quit, with precipitation, their open stations near the surface of the

water, where they assemble in small shoals, and flee to their covered retreats, or secrete themselves in the mud. The mode of life of these fishes, daily causes multitudes of them to be abandoned by the tide, when they are exposed, in small hollows, or shallow pools, to the attacks of their enemies, or the inconveniences of a limited excursion. Mr. Bosc observed in South Carolina the species, named by him *Atherina swampina*, from which the genus *Hydrargira*, of La Cépède, was instituted, and which species the Chevalier Cuvier recently included in his genus *Pæcilia*, adopted from Schneider: *Règne Animal, tome ii.* p. 198. "The individuals of this species," says the count de La Cépède, after the manuscript observations of Mr. Bosc, "appear by thousands in all the fresh waters of Carolina. They swarm particularly in the marshes, and in the lagoons among the woods. The places in which they are found being often dried up, or at least so far drained as not to afford sufficient water to cover them, they are therefore obliged to change their abode. This is effected without much trouble, in consequence of their ability to spring to considerable distances. Mr. Bosc was a witness to the speed with which the fishes advanced over a considerable space in search of more abundant water. They supply nourishment to a great number of water-birds, and of reptiles, which dwell in the lagoons and marshes." Hist. Nat. Poiss. tome v, p. 379.

The fishes of this genus are extremely tenacious of life. I once carried, in very warm weather, and to a considerable distance, several individuals in my handkerchief, which was wet; none of them suffered, to appearance, but retained their vigour on their removal to a vase of water, into which I placed them for the purpose of observa-

tion, and frolicked about as if in their native streams. After having separated, from one of them, the lower jaw, in order to examine the branchiostegous membrane, cut the branchiæ into several parts, opened the abdomen, and even removed the intestinal canal, I placed the fish in water, and it swam for ten or fifteen minutes, although the time which had elapsed, from the termination of the above mentioned operation, was about a quarter of an hour.

The three branchiostegous rays, and the other characters, assigned to the *Pæciliae*, do not comport with the species described in this article; and the characters given by La Cépède to his genus *Hydrargira*, do not appear to me sufficiently comprehensive, but are susceptible of modification. I propose the following as a substitute:

Genus HYDRARGIRA.

Characters.

Ventral fins 6-rayed.

Teeth in the jaws and throat: those of the jaws conic and recurved; none in the palate.

Jaws protractile, lower jaw longer than the upper one.

Dorsal fin one, situate nearer the tail than the head, opposite to the anal fin.

Scales on the opercula and body.

Head flat, shielded above with large scales, the centre scale largest.

All the species, which I have examined, possess the following characters in common:

Body. The *body* is thick, elongated, subquadangular near the nape, subcompressed near the tail; *abdomen* ample.

Scales. The *scales* are of a middling size; in general they are round, and marked with concentric lines, the lines of the opercula and preopercula scales are a little less distinct; all the scales of the body are crossed by lines of black points, which present the appearance of rhombic figures; these lines, in some of the species, are found, on a close examination, to be composed of a series of small tubercles, each one, in the males only, terminated in a point.

Head. The *head* is large, and supports the snout horizontally.

Gill-covers. Each *operculum* is composed of three pieces; the *interoperculum* is very small.

Nostrils. The *nasal apertures* are two on each side, situate between the eyes, and the tip of the snout.

Eyes. The *eyes* are pretty large, and seated at the summit of the head.

Lips. The *lips* are small in front, more fleshy on the sides.

Teeth. The *teeth* of the *jaws* are disposed in several rows, those of the first row longer than the rest; the superior *throat teeth* are situate on two tubercles, the lower teeth are placed at the junction of the branchial arch; the throat teeth are often obtuse.

Tongue. The *tongue* is distinct.

Mucous ducts. A series of these *ducts* open upon the head, at the end of the snout, and on the preopercula, below the scales.

Lateral line. The *lateral line* is very faintly indicated.

Fins. The *fins* are seven in number; each *ventral*

fin has its last ray united to the body by a slight membrane.

Viscera. The *intestinal canal* is simple, without cæcum; it forms two curvatures, one towards the anus, the other towards the throat: this canal, in the male, is of the total length of the body, in the female it is somewhat longer. The *air-bladder* is adherent to both sides of the cavity of the abdomen. The *oviduct* is prolonged beyond the body, and supported by the first rays of the anal fin, which rays it embraces.

A. Caudal fin truncate; branchiostegous membrane
4-rayed.

SPECIES.

1. *HYDRARGIRA diaphana*. *Body* fusiform; *head* cuneiform; *snout* elongated; *lower jaw* straight; *ventral fins* very small, roundish, situate midway between the anal, and pectoral fins; *back* nearly straight; *dorsal fin* almost double the size of the anal fin.

Dorsal, anal, and pectoral fins roundish; colour of the *back*, and the upper part of the *head*, brown-olive, *lower parts* white, *sides* with delicate blue tints; the *body* is sub-cylindric, diaphanous, ornamented with sixteen irregular, transverse, brown bands, which are confluent on the back; *opercula* with brilliant yellow and blue reflections; *eyes* large, suboblong, irides silvery white; *length* of specimen five inches, *thickness* five lines, *depth* seven lines.

P. 18.—D. 13.—V. 6.—A. 12.—C. 18 $\frac{1}{2}$ rays.

This species is accounted delicate food. It inhabits lake Saratoga, in the state of Newyork; and is procured by the anglers for the purpose of a bait for large fishes.

Var.? *Body* the same as in the preceding, *ventral fins* nearer to the anus than to the *pectoral fins*, and very small; *anal fin* subtruncate; *eyes* roundish; *snout* less elongated than that of the foregoing, and the colours of the body less lively; *sides* also marked with fourteen or fifteen transverse brown bands; *length* of specimen described two inches and a half. Found in Pipe Creek, Maryland.

P. 18.—D. 14.—V. 6.—A. 12.—C. 16½ rays.

2. *H. multifaciata*. Transverse bands of the *body* about fifty in number on each side; *dorsal fin* and *anal fin* almost equal, the latter pointed; extremity of the *pectoral fins* passing somewhat the base of the *ventral fins*; *eyes* round.

Body more elevated in the middle than that of the *diaphana*, and less transparent; the *snout* is shorter; the *ventral fins* are likewise larger in proportion; but in the *head* and *tail* there is a considerable resemblance; the *side bands* are alternately olive-brown, and blue; *length* of specimen three inches.

P. 18.—D. 14.—V. 6.—A. 12.—C. 16½ rays.

This species inhabits lake Saratoga; it is used for bait.

B. Caudal fin rounded; bran. mem. 5-rayed.

3. *H. ornata*. *Body* short, subquadrangular; *snout* very short; *lower jaw* short and curved; *dorsal fin* and *anal fin* large, the former longer than high, the latter subtruncate; *abdominal fins* rounded, placed near the *anal fin*; *pectoral fins* ovate.

Back somewhat elevated; upper part of the *head* and of the *body*, of a reddish umber colour; *throat*, *abdomen*,

pectoral, and *ventral fins* yellowish; *dorsal fin* of a clear blue colour, with small yellow spots, its posterior part marked with a large deep blue patch, surrounded with a white band, and another of blue; the *sides* are of a bright blue colour, with small white spots, and ornamented with fifteen or sixteen transverse, narrow stripes of bright silvery; *anal* and *caudal fins* of a clear blue, spotted with white, and margined with yellow; the *scales* on the head of this species are larger than those of the preceding, and disposed in the form of a rose around the centre scale.

P. 18.—D. 11.—V. 6.—A. 12.—C. $18\frac{5}{6}$ rays.

The colours of the individual described were gay; it was a male. Other specimens, which I examined, presented a difference in the disposition of the spots; some had more bands than others; and in some the colours were deeper than in others.

The female differs from the male in colour, which is of a burnt umber on the *back*, the *abdomen* whitish; the *eyes*, as in the male, are large, round, surrounded with brown, pupil black, encircled with yellow; on the anterior part of the *dorsal fin* there is a golden spot, which is visible only when the fish is in water; opening of the *mouth* of a medium size; *pectoral fins* yellowish; *anal fin* and *ventral fins* whitish; *caudal* and *dorsal* reddish; the fins are not so large as those of the male.

The oviduct, as is remarked in the common characters of this genus, is peculiarly situated; and is more conspicuous in this species than in the rest here described: it is prolonged without the body, and embraces the first rays of the anal fin, the movements of which, I suppose, facilitate the exclusion of the ova.

Length of individual described three inches.

P. 18.—D. 11.—V. 6.—A. 10.—C. $18\frac{5}{6}$ rays.

This species is very common along the flat, muddy shores of the river Delaware, in the vicinity of Philadelphia, where the Splatter Dock, *Nymphaea advena*, and the Wild Oats, *Zizania aquatica*, abound. I owe the knowledge of it to Mr. G. Ord, who presented me with the specimens from which the above descriptions were taken.

Mr. Ord informs me that the smaller fishes of this species are eagerly sought after, in the spring, by the Stone Snipe, *Scolopax melanoleuca*, and the Yellowshanks, *S. flavipes*, the flesh of which birds becomes thereby tainted with a fishy taste, which destroys that delicate flavour for which, when in good case, it is esteemed.

Var.? At Sandwich, near Cape Cod, I procured a fish, which has so general a resemblance to the last described species, that I have concluded it to be only a variety. The difference that the male presents is in the colours of his *trunk*, which is of a dark reddish brown on the back and sides, and bluish on the abdomen; and in his *ventral* and *anal fins*, which are white; there is likewise a difference in the size of his *dorsal*, *anal*, and *ventral fins*, the two first of which are subequal, and the last very small. In the female, the colour of the *back* is the same as that of the male, her *sides* are paler, and her *gill-covers* reddish yellow; her *abdomen*, *dorsal*, *anal*, and *caudal fins* bluish gray; *back* spotted with black. The lower mandible of this variety is subrectangular; the *ventral fins* of the female are seated nearer the anal fin than in the male.

P. 18.—D. 12.—V. 6.—A. 10.—C. $20\frac{5}{6}$ rays.

4. *H. nigrofaciata*. *Dorsal fin* and *anal fin* narrow and elongated.

The *back* of this species is considerably elevated op-

posite to the pectoral fins, and, by tapering regularly thence to the caudal fin, the *tail* becomes proportionally narrower than in the preceding species of this division; colour of the *body* above, a reddish yellow, deeper on the back, *abdomen* yellowish white; *caudal fin* greenish blue; the rest of the *fins* reddish yellow; *eyes* large, irides brown, the pupil encircled with yellow; *body* with thirteen or fourteen black transverse bands. The *caudal fin* of this species is but slightly rounded: it is of a medium form between that of the *diaphana* and that of the *ornata*. Inhabits the salt marshes near Newport, Rhodeisland.

P. 18.—D. 12.—V. 6.—A. 10.—C. $16\frac{2}{3}$ rays.

NOTE.

Subsequently to the publishing of my paper on the genus *Catostomus*, the fourth volume of the *Mémoires de L'Académie Impériale des Sciences de St. Petersbourg* was put into my hands. In this volume there is a good figure, with details, of a fish discovered at Kamschatka; accompanied with a minute description, in Latin, by the learned Dr. Tilesius, who accompanied the Russian commander Krusenstern, in his voyage round the world. (p. 457, plan. 15, fig. 1.) This fish, named by the above mentioned author *Cyprinus rostratus*, is a true *Catostomus*, and must be classed as such, if the nomenclators should think proper to adopt my genus in their systems.



*Observations on the Geology of the West India Islands,
from Barbadoes to Santa Cruz, inclusive. By William Maclure.* Read Oct. 28, 1817.

This range of islands may, in a geological point of view, be divided into two distinct parts, one of which, occupying the eastern side, consists of a stratification of transition rocks, partially crowned by secondary, and embraces the islands of Barbadoes, Mariegalante, Grand-terre in Guadaloupe, Deseada, Antigua, St. Bartholo-

mew, St. Martin, Anguilla and Santa Cruz; the other part, consisting of volcanic formations, with a few partial coverings of secondary, occupies the western side of the range, including the Grenadines, St. Vincent, St. Lucia, Martinico, Dominica, Basseterre in Guadaloupe, Mon-serrat, Nevis, St. Christopher, St. Eustatia and Saba, where the volcanic formation appears to terminate.

Barbadoes. The northern, southern and western sections of this island consist of rocks, formed of an aggregate of shells and madrepore rocks, mixed with different kinds of corals, being partly consolidated into a mass by the attrition of the water, having the interstices filled by the particles that have been broken, and washed into them, sometimes even losing the marks of their original formation; and partly porous and full of cavities formed by the washing away of the shells and madrepores, and by the natural shelving of these rocks. This shell limestone is deposited in four or five horizontal strata, rising gradually to the height of eight hundred feet towards the centre of the island, and forming as many *plateaux* as there are strata, resembling, at a distant view, the steps of stairs. Thence to the eastward or windward is the district of Scotland, composed of strata of slate alternating with limestone, and an aggregate cemented with lime, in grains of various sizes, and resembling much the different kinds of graywacke slate, dipping to the east, northerly, and running to the north, westerly; having every appearance of being the transition rock on which the madrepores and corals had built their cells.

Mariegalante, Grandterre in Guadaloupe, and *Deseada*, are all formed of the madrepore rock, in horizontal strata, resembling the same formation in Barbadoes, the strata

being elevated, one above another, and forming a plateau or table of land, at the summit of each, but not rising so high as in Barbadoes. Grandterre in Guadalupe has this formation, exhibiting more the appearance of undulations, with gentle ascents and declivities, containing some small streams and marshes, which would rather encourage the supposition that it rests on a volcanic basis, and is therefore more liable to have its rocks deranged from their present natural horizontal position.

Antigua. This island not having been visited by the writer, he must take its description from the specimens brought from it, by which it may be concluded, that it is similar, in some of its geological traits, to the island of Barbadoes; having the same formation of madrepore rocks, some of which are converted into silex in the form of agates, &c.; which are valued, as beautiful specimens, by the curious. A part of the island consists of a stratified rock, in the form of a green schist, crossing the island from north to south, in a zone of three or four miles width, affording the inhabitants a useful building stone. The southern side of the island is rugged and mountainous, and is described as being volcanic.

St. Bartholomew. The formation throughout this island is evidently stratified, though in great confusion, (the word stratified is here used in contradistinction to volcanic) the strata running in a direction a little to the west of north, and dipping generally to the eastward, as far as could be ascertained from the disturbed and irregular position of the broken rocks. These rocks are found to consist of three or four species of limestone, two of them containing shells; some aggregates, which are cemented with limestone, and present much the appear-

ance of transition formation; several species of hornblend rock, a little crystalline; amigdaloid, containing small nodules of *calcaire* and zeolite, or almonds, which, when the stone is fresh broken, are undistinguishable from the mass, and discover their difference only when in a state of decomposition; a soft argillaceous mass, with spots of green, resembling the green earth of Verona; porphyry, with crystals of quartz and feldspar, imbedded in a red argillaceous base, &c. all of them alternating one with another, occasionally, and assuming the appearance of a transition formation. But the various aspects which these rocks present, and the different stages of decomposition in which they are found, and in which they differ much from the rocks of a continent, or of northern climates, render it extremely difficult to determine which part may be secondary, and which transition.

St. Martin and *Anguilla* are two small stratified islands, on a line with *St. Bartholomew*, and consisting of a similar formation.

The island of *St. Thomas* may also be classed in this range. It is stratified, though in much confusion, and so deranged as to render it difficult to ascertain the general direction, which appears to be from north-west to south-east, dipping easterly. The rocks consist of a variety of aggregates, resembling the transition, some of which when fresh have the appearance of hornblend rocks, but when beginning to decompose, the aggregate appears, with a few plates of a black crystalline rock like hornblend. I found a yellowish brown quartzy aggregate, resembling a rock, in the transition, at the Lehigh Falls in Pennsylvania.

Santa Cruz. This island, though included in our first division, agrees rather with the direction of the volcanic

islands; it appears, however, that the volcanic formation ceases at Saba, and that Santa Cruz is composed of madre-pore rocks at the west, and, on the eastern side, of rocks similar to those of St. Thomas and St. Bartholomew. The west end and the middle of the island, are low, and covered with a shell limestone and madrepore rock. The foundation on which this rock reposes is a stratum that retains water, and may be a compact limestone, as the bases of many of the little hills rest on solid limestone. The east end is composed of different kinds of limestone, alternating with amygdaloid, hornblend rock and porphyry, like the rocks of St. Bartholomew; it is likewise hilly and broken, being stratified in a direction nearly north and south.

All the islands that have been described have a striking similarity both in their structure and the nature of their materials; those that are partly or wholly covered with the horizontal shell limestone, or madrepore rocks, are exactly the same; those partly or wholly formed of stratified rocks, consist of rocks more than half of which are limestone, or have considerable quantities of lime in them, and the remainder of the rocks differ very little; they have nearly the same dip and direction; have a strong characteristic mark of belonging to the transition class; though from their deranged state, and the peculiar mode of their decomposition, they differ a little in their appearance from the transition rocks of Europe, for the limestone is remarkably hard, dry and brittle, breaking into sharp pieces, which sound like a bell, when struck with a hammer: this may, perhaps, be the effect of the constant heat of the climate. The different appearance which these rocks assume, when in a state of decomposition, from those of northern latitudes, may in part be attributed to

the climate, and partly to the same cause which produced the great confusion in which they are now found, particularly, if that cause raised them from the bottom of the ocean, and exposed them to the influence of a perpetual sun. But this, like every cause which we cannot discover, must remain only problematical; for nature has so many modes of operating, and we are as yet acquainted with so small a number of them, that our speculations, beyond what we actually know, can at the best but reach to probable conjecture.

The Grenadines. This group of islands is the commencement of the second or western range; we sailed through them without stopping, so that their geological character must be taken from their general appearance, which was completely volcanic, having rocks rising perpendicularly out of the ocean, one of which is called, from its form, the organ rock, being composed of columns of basalt. The rocks are in general rugged, and so deranged that their volcanic character could not be mistaken.

St. Vincent, like all the other volcanic islands, is composed of a mixture of lava and cinders, in all proportions. South of Kingston there appears to be more solid and porous lava, and less cinders, than at the north. The Bay of Kingston has the appearance of being the remains of an ancient crater, the beds of lava inclining irregularly from the centre, at a considerable dip, as if they had been ejected from it. On every side, the rocks are aggregates of various kinds of roasted stones, cemented with cinders, and small atoms of scoria; and though many of the rolled rocks neither bear strong marks of fusion, nor resemble much recent lavas, yet they all have a family feature, and must be considered of volcanic origin. A substance like

hornblend, with feldspar imbedded in it, forms the principal part of these rocks, which vary in colour, from nearly black to gray, the feldspar being generally crystallized, and frequently diaphanous, passing through the porous or scorious rocks without indications of having undergone much change. There are two principal modes by which the production of cinders or ashes may be accounted for: they may be thrown from the crater of a volcano during an eruption of lava, and in that case they consist of small pieces of scoria, pumice, &c. and are placed in strata of various thicknesses and colours, as if deposited by water; or they may be ejected from volcanoes nearly exhausted, mixed with water and rocks, forming large beds or currents, of an aggregate, which is in time cemented, and wears the appearance of a brechia. A third mode is, perhaps, the eruption of lava into the sea, at the commencement of submarine volcanoes, when by means of the sudden cooling, the melted lava might crumble into small angular sand, and form beds of cinders. From Kingston to the north end of the island, the same alternation of cinders and solid lava obtains, forming steep precipices, and narrow vallies, the wearing and excavation of which, by the mountain torrents, is facilitated by the prevalence of the cinders, which increases as you approach the *Soufriere*, a name given, in the West Indies, to spots which indicate the remains of a subsiding volcano, and whence hot sulphureous vapours are ejected through *fumerols*, depositing sulphur, and bleaching the surrounding rocks into alum-stone, as at Solfa-terra near Naples.

The fumerols of this Soufriere are at present extinguished, perhaps by the last eruption of cinders in 1812, when the crater threw a mixture of water, rocks and cinders,

in a state approaching to ignition, resembling a current of lava; burning the woods, and filling all the channels of the little rivers that descend the mountain, rising sometimes to the height of three or four hundred feet.

This irruption consisted of a great quantity of angular sand, the broken masses of roasted and vitrified rocks being mixed with loose angular pieces of all sizes, brittle, and crumbling under the hammer. These imbedded rocks are, 1st. A rock resembling a small and middling sized grained granite, roasted, with diaphanous feldspar. 2d. A gray rock, in plates, like gneiss, but much altered by the fire. 3d. A feldspar and hornblend rock, the feldspar crystallized and diaphanous, with the appearance of having been roasted. 4th. A hornblend rock, crystalline, having a roasted appearance. 5th. A dark coloured rock, with a conchoidal, even, vitreous fracture, containing crystals of feldspar, some pieces so vitreous as to resemble pitch stone, and porphyry running through all the gradations from a gray rock, scarcely vitrified, to a total vitrification, and thence to a porous scoria, not unlike pumice, with transparent crystals of feldspar, taking a deeper tinge of black in proportion to the degree of vitrification. 6th. A bluish rock with feldspar, and some black crystals, having all the appearance of compact lava. If one supposes that volcanic action tends to form large cavities under the places whence the lava, &c. issues, and that one, or more, of these cavities, where the combustible materials are exhausted, becomes filled with water, while other cavities, where these materials still remain, are filled with lava, &c. it would appear only necessary to unite the contents of two such caverns to produce all the effects of an irruption of cinders.

St. Lucia I passed, and only observed it from the sea. It has the appearance of being rugged and steep, with few vallies, and perhaps not the same proportion of cinders as the other islands. It has an extensive soufriere at the foot of two sharp conical hills.

Martinico. On the south side of the Bay of Port Royal, at Lamentine and point De Bourg, there is a compact rock, dividing like trap, and decomposing into balls, which fall into a strong red clay, making an excellent soil; it rests upon a bed of cinders, and assumes in some places the form of Basaltic columns.

About Port Royal, and the hill to the north of it, there is a current of solid lava, which has formed the north side of the bay, decomposing into balls, and forming a strong soil.

From point Negro to St. Peters the coast consists principally of cinders, mixed with lava rocks. Under the fort at the south end of St. Peters, and near the Botanic Garden on the north side, there appears a mass of the same rock as occurs at Port Royal, approaching the Basaltic form, and is full of vitreous crystals of Feldspar.

The region lying across the island from St. Peters to Bass-point, is composed, wholly to the summit of the land, of cinders and pumice, with vegetable earth lying between the beds of cinders, alternating two or three times. Descending to the windward part of the island, the cinders are found mixed with detached pieces of compact lava, and other rocks, with large blocks of pumice, till you come to the flat country, which is covered with cinders. It is natural to suppose that the greatest part of the light substances, such as cinders, pumice stones, &c. should go to leeward; yet in the irruption of St. Vincent, in 1812,

very fine cinders fell on the decks of vessels three or four hundred miles to windward, supposed to have been carried by a counter current of air, in the upper regions of the atmosphere.

Dominica is in general composed of cinders, with rolled and detached pieces of lava, pumice, &c. disseminated so as to form a kind of pudding-stone, containing five times more of the cement than of the detached pieces. Where compact lava appears, it is in masses, seldom in currents, and generally covering the cinders, and is also covered by them.

The soufriere is in the bottom of a bay, at the south end of the island, and has all the appearance of being the remains of an ancient crater: it is extensive, and furnishes at times both sulphur and alum, the quantity of alum rocks being considerable. There are other fumerols in the interior of the island, which might furnish alum and sulphur.

On the top of the mountain, as you cross the island, there is a lake, having all the appearance of being an old crater, about which the quantity of loose stones is greater, and of cinders less, than on the coast.

A bed of coral and madrepore limestone, with shells, lies horizontally on a bed of cinders, about two or three hundred feet above the level of the sea, at Rousseau, and is covered with cinders to a considerable height.

Basseterre in Guadaloupe. On landing at St. Rose, at the north end, the red clay occurs as at Lamentine in Martinico, and is the result of the decomposition of the same compact blue basaltic rock, which appears to prevail over all the low country, dividing Grandterre from Basse-

terre. This blue rock is placed on a bed of cinders, and takes the form of an irregular basalt.

From St. Rose to Delahay, along the coast, the head lands appear of solid rocks, like currents of lava, separated by narrow sandy vallies, the sand being partly white and calcareous, formed by the trituration of shells; and partly black and ferruginous crystalline, from the decomposition of solid lava: this ferruginous sand is found in all volcanic countries, and frequently is a distinguishing characteristic of volcanic regions. At a head land, about one league north of Pigeon Island, called Malendure, there occurs a current of red cinders, filled with small prisms of red stilbite, and having loose pieces of lava mixed, containing also the red stilbite; this makes the third locality where I found the red stilbite, two of them, viz. Vesuvius and this, are undoubtedly volcanic, the other, the valley of Fal-sa; in the Tirol, has been supposed to be of Neptunian origin by the Wernerians. Along the coast of Basseterre is found a mixture of cinders and lava, but more solid lava in currents, than in the other islands.

About six leagues to the top of the cone, where the crater had been, and where the soufriere is now, I found a chasm or crack, in the mountain, which had all the appearance of having been once a crater, but which had been closed by some convulsion, where, by the removal of the middle, the sides had been impelled together with such force, as to break up the walls, and leave the whole in the greatest confusion. The fumerols are on the side of this crack, without any accumulation of sulphur, or alum rock, for these substances fall into the crack as fast as they are formed. The scenery is exceedingly rugged and wild; the rocks broken in immensely large masses, and irregu-

larly thrown about in every direction. At the northern extremity of this crack lies what is called the cave, whence there issued, about 15 or 20 years ago, a flood of water and rocks, which ran down the valley, at present called the valley of Faujas, in the utmost disorder. I am inclined to think that water only came from the crack, and that it ran over the mountain, sweeping in its course all the small stones and cinders, leaving those that were too large to be moved. This irruption of water was cool, and without any apparent connection with heat, though it was most probably ejected by the force of some elastic fluid.

Montserrat. I passed close to the leeward side of the island of Montserrat, but did not land. The south side had an appearance of being partly composed of solid rock, and the rest of the island might be supposed to be constituted of cinders mixed with loose rocks, as it consists of one mountain, the sides of which are furrowed by the rain, gently, and not in precipices, as would have been the case had there been many currents of solid lava, which circumstance, with the flatness of the coast, and the gradual ascent of the mountain, would seem to indicate a great proportion of cinders.

Nevis consists of one mountain in the middle, a truncated cone, I suppose about 2000 feet high; and one small elevation to the south, called Saddle-Hill, and another to the north, called Round-Hill; the rest of the island is a gradual descent from these three hills to the sea. It is composed of large masses of rocks, in beds of cinders, gray, red, and black, of various degrees of solidity, from the pumice to the compact lava; the black crystals I take to be augite, or perhaps what Werner calls the basaltic hornblend, of the Cape de Gate in Spain, many of the

rocks being like those found at that place. The white or glassy I take to be feldspar, which, with a black substance resembling hornblend, constitutes a great proportion of the rocks of the volcanic islands in the West Indies. The nodules which are found occur more frequently in the centre of other rocks, they are of a small compact grain like greenstone and not unlike those rounded pieces found in granite.

About one mile and a half S. E. of Charleston, there is a soufriere almost extinct, which occupies about two or three acres of a level spot. One mile below, there is a hot spring, the water of which rises to 110 degrees of Fahrenheit, and is used as a medical bath; and on the edge of the sea, about half a mile distant, the heat of the earth is sufficient to make the water boil. To the north of Charleston there are likewise soufrieres, and there can be little doubt that on all the islands, there have been a number of soufrieres which are now extinct and wasted away.

St. Christopher. This island, near Basseterre, consists of beds of black, red, and gray cinders, varying in thickness from two inches to many feet, containing black and white crystals, resembling those found in the last cinder eruption of St. Vincent. The sand on the bay of Basseterre is mostly of the black iron kind, with scarcely any of the broken shells or madrepore rock. Along the coast to Old-Road, the formation is of cinders, with few detached rocks, and the same from Old-Road to Brimstone-Hill.

Brimstone-Hill is a stratification of madrepore limestone, containing shells, at an angle of upwards of 50 degrees from the horizon, reposing upon a bed of volcanic cinders, and partly covered by volcanic eruptions, making

a fine specimen of the alternation of the Neptunian and volcanic formation, which, for ought we know, may be repeated twenty or thirty times in the foundation of these islands, as every current of lava that runs into the sea is liable to be covered with corals, madrepores, &c. and afterwards recovered with lava, until it comes above the surface of the sea.

On the south end, above Sandy-Point, there is more pumice stone, and at a point a little north there appear to be solid masses of compact rock, which look like currents of lava. From Sandy-Point to Deep-Bay, the rocks which occur are those mixed with cinders of a black colour, and full of glassy or transparent crystals.

St. Eustatia is formed of two hills that appear to have been both craters of volcanoes; the western one is more ancient and is filled up with earth, &c.; the eastern one is higher and appears to be more recent, the crater being only partially filled. The space between these two hills is filled with cinders, forming a plain with a bay on each side, the one to the leeward is the harbour, on the edge of which stands the town.

On the south-east side of the large hill, towards St. Christopher, there is a stratification of madrepore limestone, alternating with beds of shells, similar to those found at present in the sea. The whole of this marine deposition dips to the south-west, at an angle of upwards of 45 degrees from the horizon, resting upon a bed of cinders, full of pumice and other volcanic rocks, and is immediately covered by a bed of madrepore, sand and cinders, mixed together, with blocks of volcanic rocks so disseminated that there can be no doubt of the volcanic origin of the substance above and below the madrepore rock, which may be from

five to six hundred yards thick. Part of this madrepore rock is changing into silex, having the part that surrounded the animal already converted into chaledony. A considerable quantity of gypsum is found near the same place, in a crystalline state.

Saba. This little island seems to finish the volcanic formation, and consists of one mountain, rather rougher and more rugged than St. Eustatia, but apparently of nearly the same kind of rocks.

The foregoing description of the volcanic islands may perhaps authorize the following general remarks.

1st. That there is a great similarity in the substances ejected, which are marked by a family feature running through all the rocks, cinders, &c. of the different islands; and it is to be observed that the proportion of cinders, pumice, and other light substances, is much greater than of the solid lavas, which are but thinly scattered; also that the cinders are always the lowest stratum on a level with the sea; and the masses of solid lava, near that level, repose on a bed of cinders, in every place where I had access to *them*.

2d. The madrepore and coral rocks, mixed with shells, partly similar to those found at present in the sea, are found in many places alternating with the cinders, and other volcanic rocks, presenting much the appearance of the whole having been ejected from the bottom of the ocean.

3d. The direction of the islands, running from north to south, a little easterly, corresponds with the direction of the strata of those stratified islands, lying to the eastward: such as Barbadoes, St. Bartholomew, &c. which should seem to support the supposition, that the seat of combustion occupies a stratified substance, running parallel to the general stratification of the surrounding rocks.

4th. In all the islands there are one or more soufrieres, all of which form alum rocks, and deposite sulphur, proving that sulphur is one of the ingredients that support the combustion, and perhaps giving strength to the supposition, that whatever may have been the original cause of the combustion, that cause is uniform, and the same through all the islands.

5th. In the irruption of cinders, lately ejected, there was a great quantity of stones thrown out, exhibiting no appearance of having ever been in a state of fusion, but only roasted by a considerable heat; most of these rocks have every appearance of belonging to the primitive class, by their crystalline structure, and the position of their component parts. From which remarks it would appear reasonable that the following conjectures may be hazarded.

1st. That the islands were probably thrown up from the bottom of the ocean.

2d. That the seat of combustion is more probably in a substance stratified, and that sulphur is one of the combustible ingredients.

3d. That the substance so stratified is most probably the primitive, and that consequently the combustion is in the primitive region covered by the transition, which forms the islands of the eastern group.



*Observations on several species of the genus ACTINIA;
illustrated by figures. By C. A. Le Sueur. Read
November 18, 1817.*

In the course of my observations on the Mollusca, I had observed that several animals, of different genera, particularly the *Hyantinæ*, were possessed of a series of small

vesicles, very symmetrically disposed and joined together, to which they were attached by a true limaciform foot; and I was not astonished to meet, in other animals, with parts of similar conformation. Several species of that genus known under the popular names of Sea-anemones, Animal-flowers, &c. (*Actinia*, Linn. *Acalyphe*, Cuv.) are equally provided, at their base, with a disc, composed of small air-bladders. Until lately the *Actiniæ* were regarded as altogether littoral; it is now ascertained that some species are pelagic, and, furnished with the above mentioned organs, float freely at the surface of the ocean.

Before proceeding to the history of the latter, I will here indicate the different species that I have observed, in which it appeared evident to me that one could distinctly trace them down to the madre pores. And first, I will mention those that are free, and have the faculty of floating at the surface of the sea. A second species attach themselves to floating fuci, or other moving bodies. We may see a third travelling slowly at the bottom of bays, adherent to the shell which is tenanted by the *Pagurus* or Hermit Crab. Dredging in the bays of St. Vincent and Barbadoes I noticed several instances of this kind. Other species, preferring a more solitary life, are attached to stones, situate at a certain depth in sand, where the animals retire, and conceal themselves by contraction. Others, again, equally solitary, prefer large broken shells, or the cavities of rocks. Others, more social, appear in groups upon rocks, which they cover in part, choosing tranquil places, and supporting themselves at a pretty great depth, in order that they may not be incommoded by the waves. Others, resembling the preceding, extend their tentacula, so as to appear like flowers, and carpet the bot-

tom near shores, or raise between rocks their radiated discs; if one removes these rocks, one will find the animals united by their long peduncles. If we proceed farther we shall find others, less fearful, united in close groups, joined together by the base of their peduncles, and exposed to the action of the waves upon the rocks, and the marine plants to which they fix themselves. From the last species we pass to other animals, which, whilst they are perfectly expanded, equally present the aspect of Actiniæ, though in miniature: their peduncles being very short, the animals, when contracted, resemble mammæ of three or four lines long, crowding one against another on the same base, which may be likened to thick smooth leather. These are found covering the base of the rocks of the entry of the ports of St. Vincent, and Guadalupe, and exposed to the action of the waves. It should seem that by their large expansion they are intended to protect the rocks from the attrition of the waters, which good office their unctuous liquor may subserve, by soothing the force of the waves. If we carry our researches further, we shall find others, analogous to the last, and equally exposed with them on the rocks, but endeavouring to disguise or conceal themselves by assuming the appearance of the rocks, which is effected by forming their base, and envelope, of very fine sand, agglutinated together by means of mucous, with which the animal is copiously supplied. This species shut themselves up in this kind of crust, and only permit an orifice to each cell. The encrustation, when dry, is pretty hard, and resembles a madrepore in the disposition of the cells; the animal, likewise, assuming the appearance of a madreporic animal, justifies us in considering the latter, to a certain point, as

actiniform animals, furnished with a calcarious crust or habitation. Judging from external appearance, the passage of the Actiniæ from their free state, by regular gradations, to the madrepores, is very evident.

After this hasty sketch of an interesting series of animals, recently observed by myself in the West Indies, I shall give an account of those of the first division of my table, of which species no descriptions have yet been published. The first of these was discovered by Péron and myself in our voyage to Australasia.

But before proceeding to their description, I will give the observations made on a species, during a passage from Europe to the West Indies, in company with Mr. Maclure. On the 12th December, 1815, a short time before our arrival at Barbadoes, being then in lat. $21^{\circ} 0'$ —long. $32^{\circ} 59'$, the temperature of the sea, at noon, being at 19° of Reaumur, I discovered several individuals of a very small species, to which I gave the name of *Actinia minutissima*. Their bodies were soft, cylindric, of a very white colour, and opaque, with no visible tentacula; their base was contracted. These individuals took different forms: sometimes they lengthened themselves, at other times they assumed the appearance of a Doris, for which they might be mistaken by a superficial observer. This species being very diminutive, I shall pass it over with the above brief notice.

On the 24th December, in lat. $13^{\circ} 7' 30''$. long. $48^{\circ} 25'$. the temperature of the sea being $20\frac{5}{10}$ Reaumur, I had the satisfaction of taking a fine specimen of a new species, on which I made the following observations:

ACTINIA olivacea. (Plate VII. fig. 1.) The body of this species when taken was contracted, hard, of the form of

a melon, and was divided into twenty-two equal lobes, resembling those of the pulp of an orange, plaited in a zigzag manner, the extremities being closed, by the junction of their borders, like a purse which shuts at both ends. When the animal begins to dilate, one perceives, at its superior part, a white coloured disc, which is composed of small air-vessels, that serve to support the animal at the surface of the water, and is always uppermost when it floats, the mouth being situated in the lower extremity. This vesicular disc is surrounded with tubercles, corresponding to each lobe or division. The plaits of the divisions, and the black points of their extremities, are furnished with small suckers, by means whereof the animal has the faculty of adhering, pretty strongly, to any body. The opening of the mouth is central, linear, surrounded by small plaits, whence those divisions have their origin which serve as the base of the tentacula, which are short and tuberculated, simple and very small near the centre, trilobated and multilobated towards their extremities—these tentacula are disposed in rays, alternately great and small. The most conspicuous tuberculated lobes have a small linear depression at their summit. I did not remark that the tentacula were furnished with suckers or fasteners, which one observes on those of several other species of *Actinia*.

This species, in common with many others, can assume different forms: sometimes it resembles a reversed vase, the base being more or less expanded, and the other extremity more or less contracted; it can also lengthen itself until the zigzag plaits of the divisions disappear.

On the 29th December we arrived at Barbadoes. I took my *Actinia* ashore, in a glass vase, and, after having given it a change of water, it remained contracted in a

subglobular form, without any appearance of a disposition to dilate. The great heat of the weather induced me to darken the chamber wherein the animal was kept; and I walked out to continue my researches on the shores of the island. On my return, which was in about two hours, I found my *Actinia* expanded, and adhering to the bottom of the vessel, in the manner of other species of the genus; whilst its air-bladder was detached, and floating on the surface of the water. Its tentacula assumed the appearance of a white flower, and formed a fine contrast with the green-olive ground of the body, and the yellow band of the border. I will here remark, that every time that I wished the animal to dilate itself, I was obliged to darken the place wherein it was kept, either on board the ship, or on shore; and that it contracted itself in proportion as the light was let in upon it. It should seem, from the above remark, that the organs of sensation of these animals are very delicate, since the light so soon affects them. They prefer the evening, or the night, to perfectly unfold themselves, and display their flower-like tentacula.

The negligence of the person to whom I had entrusted the care of my *Actinia*, (in not changing the water daily, as I had been accustomed to do,) during the time that we made an excursion to the famous Animal flower Grotto, situate in the north end of the island, occasioned the death of this fine specimen, that I had carefully preserved alive for the space of ten days. This was a mortifying circumstance, as I wished to ascertain whether or no the animal possessed the faculty of reproducing its air-bladder, which was detached as before mentioned.

(To be continued.)

An Account of the Crustacea of the United States. By
Thomas Say. Read November 4, 1817.

(Continued.)

The two following undescribed animals possess characters so distinct from any genus hitherto established, that I have thought proper to connect them under a new genus. By the conformation of their organs of locomotion, they will serve to approximate still more closely the orders *Brachyura* and *Macroura*, than has been done by the genus *Porcellana*. To this genus I have applied the name of *MONOLEPIS*,† from the Greek words signifying *one* and *scale*, in allusion to the conformation of the tail. I shall here lay down its characters, at length, distinguishing them into essential, natural, and artificial, and finally note the affinities of the genus.

Order MACROURA.

Head intimately united with the thorax; *feet* ten; *abdomen* beneath furnished with five pairs of natatory feet; *tail* with lateral foliaceous lamellæ.

Genus MONOLEPIS.*

Essential Character.

Hind-feet very small, folded on the posterior angle of the thorax; *caudal lamellæ* simple on each side.

Artificial Character.

Thorax oblong, narrowed before, equal, emarginate over the insertion of the abdomen; *eyes* very large, remote, lateral; *external pedipalpi* incurved, joints subequal, the

† From *μόνος*, one, and *λεπίς*, a scale, in allusion to the caudal lamellæ.

terminal one abruptly straitened, internal peduncle with the radical joint somewhat dilated on the inner edge, second joint half as large as the preceding, suboval, entire, rounded at tip; *anterior feet* didactyle; *second, third, and fourth* pairs simple; *fifth* pair much smaller and generally terminated by setæ; *abdomen* not longer than the thorax; *tail* furnished with a single lamellæ on each side.

Natural Character.

THORAX convex, equal, longitudinally oblong, gradually a little narrowed before, so as to pass between the eyes, terminating before in a short rostrum, posterior margin of greatest breadth, emarginate over the insertion of the abdomen, posterior lateral angles, with an abbreviated, slightly impressed groove above, for the reception of the posterior feet, sides of the body abruptly deflected, vertical, slightly grooved to receive the feet; *eyes* remarkably large, rather thicker than their peduncles which are short, inserted on each side of the anterior part of the thorax, and destitute of prominent orbits; *antennæ* four, placed between the eyes, *external ones* eleven-jointed, inserted between the anterior angles of the mouth and the base of the peduncles of the eyes, folded upon themselves at the third joint when at rest, *first and second joints* nearly equal, the former cylindric, the latter a little dilated beneath, with a few hairs, *third* rounded half as large as the preceding; *fourth and fifth* very short, subequal, *eighth* as long as the two preceding ones conjunctly, terminated by two setæ which extend to the apex of the antenna, *terminal joint* minute, tipped with a seta; *interior antennæ* thick, bifid at tip, folded and concealed on each side of the rostrum, and attached to a large, rounded, conspicuous peduncle; *body* beneath (*pectus*) with an

abrupt, profound fossula for the repose of the abdomen; *feet* moderate, anterior ones didactyle, second, third, and fourth pairs equal, simple, posterior pair very small, folded on the lateral angles of the thorax, and terminated by elongated setæ.

ABDOMEN semicylindric, not longer than the thorax, of six segments, first segment very short, concealed by the thorax, second, third, fourth, and fifth equal, consimilar, transverse, convex, with acute posterior lateral angles, sixth segment very short, depressed; *natatory feet* large, prominent, internal division of the bifid tip, very small; *tail* as broad at base as the terminal segment of the abdomen, rounded at tip, simple, concealing the lateral foliaceous appendages; *lateral lamellæ* composed each of a single, small, membranaceous, suboval piece, ciliated with long hair, and supported by a short peduncle.

SPECIES.

1. *M. inermis.* Tarsi* simple; *hind feet* very small, terminated by three setæ; a large truncate tubercle behind each eye; *rostrum* deflected.

Inhabits the eastern shore of Maryland.

Cabinet of the Academy.

Thorax olivaceous-green, with minute darker spots, an impressed circle between the posterior recipient grooves, two small, geminate, deeply impressed punctures, on the middle of the thorax, before which on each side is an oblique, irregular, impressed line; *clypeus* unequal, extended into a short rostrum, which is deflected, adpressed to the face, margined, and furnished with a tooth on each side near the eyes; a large truncate tubercle behind each eye, upon the lower-edge of the body, as long as the peduncle of the eye; *anterior feet* rather small,

shorter than the others, hand gibbous above and furnished with a tubercle at the base within; *tarsi* simple as long as the preceding joint, those of the posterior feet furnished with three, elongated setæ at the extremity; *pectoral groove* with the margin elevated, interrupted, unequal.

Length of the thorax one fourth of an inch.

Of this interesting animal I found several specimens on the eastern shore of Maryland, which had been cast on the beach by the refluent tide. They appeared desirous to protect themselves from the dashing of the surf, and the influence of the sun, by burrowing in the sand, in order to wait the return of the tide; but their efforts had no further effect on the compact sand, than to raise a small portion of the surface, which, by the action of the waves was spread over them so as to be distinguishable from the general surface by a small elevation.

2. *M. spinitarsus*. *Tarsi* spinose beneath; tubercle behind the eyes obsolete; *hind feet* terminated by three setæ; *rostrum* deflected.

Inhabits South Carolina.

Cabinet of the Academy.

Clypeus rather prominent between the eyes; *rostrum* deflected, and adpressed to the face; tubercle of the side of the body obsolete; *tarsi* armed beneath with about seven, rigid, acute spines, of which the fifth one is largest, and the sixth one smallest, tip incurved, acute; *pectoral groove* with the margin simple, equal; *hind feet* smallest, terminal setæ longer than the tarsus, and inserted near the tip.

Length of the thorax rather more than $\frac{1}{4}$ of an inch.

This description is drawn from two specimens in the possession of the academy which were found about thirty

years ago, on the coast of South Carolina; they had been preserved in spirits, but were lately taken out, to be more conveniently arranged in the cabinet, by exposure to the air and the evaporation of the liquid, they had become considerably contracted, but the striking character of the spinous tarsi, even if the other traits were deceptive, from desiccation, is very sufficient to distinguish it from the preceding species.

The characters of the remarkable animals of which I have here thought proper to construct a new genus, widely differ in essential particulars, from those of all other genera, as defined by naturalists. From a transient view, or slight examination, we would be disposed to refer this genus to the first order of Brachyura, in consequence of the great similarity of habit, which its species bear to that of the individuals of that order. But however closely it may be allied to the Brachyuræ in point of external figure, it is very certain that the character, drawn from the conformation of the caudal lamellæ, is of itself sufficient to exclude it absolutely from that natural group of the Crustacea, in which the tail is invariably simple, or destitute of lateral appendices of any kind.

The precise situation it ought to occupy in the order to which I have assigned it, may perhaps be, with more difficulty, determined. This difficulty does not arise from any proximity, which *Monolepis* can claim, with any of the existing genera, but, in consequence of its remoteness from either of them. There is no genus of the genuine Macroura which is furnished with a less number than two foliaceous appendices on each side of the tail, and but one (*Porcellana*) that has the abdomen inflected into a groove beneath the body. The resemblance of this last genus

to the Brachyura is so imposing, that it is but recently it has been referred to its true place in the system, yet it is worthy of remark that the lateral processes are very conspicuous, crustaceous, and never withdrawn under the middle division. In *Monolepis*, on the contrary, the lamellæ of the tail are minute membranaceous, hyaline, and entirely concealed beneath the middle division, to which they are so closely applied that the unassisted eye would not detect their presence.

These differential characteristics, by which the genus under consideration is distinguished, combined with the form of the antennæ, which it must be confessed is very closely allied to that of the Brachyura, seem to indicate its true situation in the system. It would indeed appear to supply an intermediate shade, a more closely connecting link in the gradation, by which the two orders to which I have referred, are approximated. Hence in an arrangement perfectly natural, it would be the first of the order, but in the artificial system it will precede the genus *Porcellana*, forming of itself a division of the Macroura.

Genus HIPPA.

Hands simple, compressed and oval; the tarsus of the second and third pairs of feet lunated, of the fourth triangular. *Eyes* supported upon a filiform peduncle.

SPECIES.

1. H. *talpoida*.* *Body* convex, oval; four anterior segments of the abdomen not inflected and having the natatory appendices of the tail, reflected on their sides; *tail* elongated, more than half as long as the body, sublanceolate; *clypeus* with two sinuses forming three teeth; *eyes* minute.

Inhabits the coast of the United States; common.
Cabinet of the Academy.

Thorax imbricately rugose before, rugæ interrupted, undulated on their edges; an impressed, abbreviated, transverse line, near the anterior teeth, and a curvilinear one before the middle; deflected margin dilated and ciliate behind the middle, and subserrate before the middle; *external antennæ* as long as the thorax, with the second joint of the pedicel largest, of the colour of the thorax, and two spined at tip: at the base before, of the anterior spine, a deep fissure, forming almost a third tooth: third joint convex above, with a fissure near the exterior tip; fourth joint cylindrical, attenuated at base to receive an elongation of the preceding one; *eyes* very small, pedicels filiform, prominent; *feet* and dilated basal joint of the external pedipalpi ciliated; *anterior feet* with the third joint dilated, and traversed by impressed, interrupted lines of ciliæ; fourth joint mucronate at the exterior tip: fifth triangular, margined within with reflected ciliæ: *hand* margined on the outside; *tail* and last segment of the body reflected under the thorax, nearly reaching the base of the palpi, attenuated, sublanceolate, margined, with reflected ciliæ above, and inflected ones on the edge, with two short impressed lines at base.

Length from the clypeus to tip of tail two-inches, greatest breadth near three-fifths of an inch.

Known generally on the coast by the name of *Sandbug*, and may be found burrowed in the sand of the beach, at the recess of the tide; its exuvia is frequent on the line formed by the extreme wave. This species certainly approaches very closely to the *H. emerita* of authors, but Mr. Latreille observes of that animal, that the antennæ are

half as long as the thorax; this character, if constant, and not a sexual difference, is very sufficient to distinguish that from our specimen, in which the antennæ are equally long with the thorax. In other respects this Hippa agrees very well with the excellent detailed description of the *H. emerita*, by Mr. Latreille, in the *Hist. Nat. Crust. et Ins.* It may not be superfluous to observe, however, that all the descriptions I have seen of that species, with the exception of the detailed one above-mentioned, represent the last segment of the tail as oval; and although under the generic head Mr. Latreille's words are, "son dernier segment est alongé, triangulaire," yet under the descriptions of species, we have "Caudæ ultimo segmento ovato."

Genus PAGURUS.

Interior antennæ short and bifid at tip; exterior ones setaceous and longer; *body* oblong, *thorax* crustaceous; *abdomen* vesicular, naked, soft and furnished at tip with hooks or holders.

SPECIES.

1. *P. pollicaris.** *Thorax*, with the first segment, depressed, rounded and broader before; *right hand* larger, granulate, almost tuberculate, subspinous above on the wrist: *thumb* above elevated into a prominent angle, *hand* and *finger* crested and denticulated beneath.

Inhabits the coast of the United States.

Cabinet of the Academy.

Anterior segment of the thorax subcordate, truncate behind; posterior segment gradually dilated to the base, where it is emarginate for the reception of the abdomen; small scales at the base above of the pedicels of the eyes

small, simple, somewhat concave on the disk, and terminating in a rather obtuse point; *hands* unequal, the right one larger, covered with large and conspicuous granulæ, beneath crested, and dentated to the tip of the finger; *thumb* above projected almost into a right angle; *wrist* with scattered but larger tubercles than those of the hand, subspinous above; thumb of the smaller claw not angulated; *thighs* of the second and third pairs of feet, glabrous, above rugose, two following joints glabrous, above spinous, somewhat hairy; *tarsi* mucronate, nearly equal to the two preceding articulations conjointly, ciliate with hair, compressed and strongly marked by an impressed line on each; appendice to the pedicel of the exterior antennæ as long as the eyes.

Length of the thorax one inch and one fourth.

A large species; it is often cast ashore during the prevalence of heavy north-east winds, otherwise it is not often found. Inhabits our largest species of shells, such as *Natica rugosa*, *Pyrula caniculata*, *Pyruly* (*Fulgur*, De Montfort) *eliceans*, &c.

2. *P. longicarpus*.* Right hand larger and longer than the left; *wrist* and *hand* rather long, linear and granulate; *fingers* short, white, equal.

Inhabits bay shores.

Cabinet of the Academy.

First segment of the thorax rounded, narrowed behind, and truncate at tip; second segment gradually dilating behind, emarginate at base for the reception of the abdomen; small scales at the base above of the pedicels of the eyes simple, concave on the disk, and terminating in a rather obtuse point; anterior feet somewhat elongated;

wrist linear, beneath ventricose, as long as the hand, scabrous, with a light groove above, formed by two lines of granules; *hand* linear, granulate, with a moniliform edge beneath, and raised line on the exterior side; *second* and *third pairs of feet* elongated, glabrous, with a few hairs, two penultimate joints punctured, and above serrate, *tarsi* scabrous, cylindrical, incurved, as long as the two preceding joints conjunctly: feet annulate.

Length of the thorax three tenths of an inch.

Very common in our estuaries are generally seen near the edge of the water, running actively about seeking food, or a more commodious or elegant shell, than that with which they are already furnished; they are very quarrelsome and approach each other with great caution. When two of them unexpectedly meet, they immediately and rapidly recede from each other, to a safe distance, in order to consider their respective strength: a combat sometimes ensues, which consists of a variety of movements, the object of which is to drag the adversary out of his dwelling. I have seen a large and powerful individual, whose shell was old and broken, attack one of inferior size, with the obvious intention of plundering him of a shell superior to his own.

They take possession of a *Nassa* and a *Turbo*, which are very numerous on our coast; but they may be found in almost every different univalve, regardless of the species; they take possession of any one, that is of a commodious size, but never, as far as I could observe, do they destroy, or offer violence to, the original inhabitant or fabricator of the shell. When recent, the feet are annulated with reddish-brown and whitish.

Genus ASTACUS.

Antennæ inserted in nearly the same horizontal line; *six anterior feet* didactyle; the anterior pair largest; middle division of the caudal lamellæ broader at base; external division biparted.

SPECIES.

1. *A. marinus.* *Rostrum* two or three-spined; each side, a smaller simple one each side of the base, one more distant on the thorax, one usually beneath near the tip; *carpus* above five-spined; *hand* six or nine-spined on the inner edge.

Astacus marinus americanus.—Seba tom. 3. tab. 17. fig. 3.

Inhabits the rocky parts of the coast.

Cabinet of the Academy.

Body with numerous, small, unequal, excavated dots; *thorax* with a dorsal, linear, cicatrice, drawn from near the tip of the rostrum to the base of the abdomen, the last joint of the *abdomen* with two remote fascicles of hairs at tip, lateral angle duplicate beneath; *tail*, middle division simple, one-spined each side near the tip, a fascicle of hair near the base above, inner latteral lamella one-spined at the external angle, external one with rather acute spines at the junction of the accessory plate, outer margin rugose; colour, when recent, olivaceous-black, with darker spots, and varied with yellowish bands, beneath and tips of the spines orange-red. Caudal cilia fulvous.

Length

Seba appears to have been the only naturalist who has considered this species as distinct from the very prox-

imate European one. Under the trivial name here adopted he has figured it in his large work. There is no doubt but they are exceedingly similar, and it is probable that at the first view no one would suppose them distinct; but if we may rely on the laconic descriptions which have been given of the *gammarus*, there are certain traits of difference, sufficient to authorize a separation of the species. The *gammarus* is said to have a double tooth or spine each side of the base of the rostrum, the rostrum itself has four or more teeth each side, the bands have four, five, or six spines on the inner edge; in our species the teeth at the base of the rostrum, are small and simple, the rostrum is two or three toothed each side, and the inner edge of the bands six to nine spined.

The Linnæan name *gammarus* was rejected by Fabricius, and *marinus* was substituted in its stead. Notwithstanding this authority, Dr. Leach has, and, I think with great propriety, restored the name applied by Linné, inasmuch as it was given and published prior to that of the Entomologist of Kiel, and this reason, if the word be anywise admissible, according to the rules of the science, is I should conceive, ample of itself. The term *marinus*, as applied to the European species, being thus rejected, I have adopted it agreeably to the intention of Seba, for the one here described.

This is the *Lobster* of our markets; it is brought in considerable numbers to Philadelphia, in the fish wagons, from Long-branch, part of the coast of New-Jersey, in excellent preservation, and generally alive; they are much esteemed as food, and are sold at 18 cents *per. lb.* They are taken pretty much in the same manner as at the fisheries on the coast of Great Britain, by means of pots or traps,

made of slats or osiers, formed somewhat in the manner of a mouse-trap, baited with garbage, &c. attached to a cord and buoy, and sunk by means of a weight.

2. A. *Bartonii*. *Rostrum* mucronate, concave; *thorax* unarmed; *hand* short, destitute of spines; fingers moderate.

A. *Bartonii*, Latr. Gen. Crust. et Ins. v. 6, p. 240, from Bosc's Hist. des Crust.

Inhabits the small streams of fresh water of the United States.

Cabinet of the Academy.

Body and extremities with scattered, very visible punctures, more conspicuous on the hands and fingers; *rostrum* rather short, attaining the tip of the second joint of the peduncle of the inner antenna, suddenly attenuated into an acute termination, without any appearance of lateral spines; spines behind the eyes obsolete, no vestige of spines on the thorax; *anterior feet*, third joint with short spines beneath, above unarmed; *carpus* armed with a strong spine within, near the middle, behind which, near the base, is usually a smaller one, on the disk above is an abbreviated deeply indented groove; *hands* short, with large punctures, distance from the inner hind angle to the thumb joint, hardly equal to one half the length of the thumb, beneath rounded or without an edge; *fingers* with large punctures, *caudal lamellæ* ciliated, first segment of the middle one two spined each side at tip.

Length from the tip of the rostrum to that of the tail, two inches.

This species is very common in rivulets and small streams of fresh water, under stones, &c. it is familiarly

known by the name of *Craw-fish* or *Fresh-water lobster*; with many it is esteemed as a delicious food, though not much sought after, but in some parts of the country, children eat them alive, or only their claws. It was first described as distinct from the *fluviatilis* by Mr. Bosc, who named it in honour of the late professor B. S. Barton.

3. A. *affinis*.* *Rostrum* mucronate, subcanaliculate, two-spined; a spine behind each eye, and a larger geminate one, on each side of the thorax; *hand* and *thumb* on the inner edge scabrous.

Inhabits the river Delaware.

Cabinet of the Academy.

Body and extremities with scattered distinct punctures, which are not conspicuously larger on the hands, all furnishing hairs, from one to four in each; *thorax* with a double, prominent, acute spine each side, behind the transverse arcuated band, which is deeply impressed, and terminated on the anterior lateral edge, at an acute spine; a spine on the peduncle of the base of the scale, and a moveable one at the base of the second joint of the peduncle of the exterior antenna; interior antenna with a prominent spine on the first joint of the peduncle beneath; a group of four or five spines between the base of the exterior antenna and the double spine; *rostrum* acutely spinose each side near the tip, tip attenuated into an acute spine, which rather surpasses the tip of the third joint of the peduncles of the interior antennæ, abbreviated carina each side of the base, elevated, and terminated behind the eye in a spine; *anterior feet*, third joint with a double series of spines beneath, two above placed obliquely, two smaller ones at tip, and one behind the outer condyle; *carpus*

four-spined, of which the largest is situate on the inner middle, one behind each condyle, and one beneath; an indented line above; *hands* moderate, punctures hardly larger, but more hairy, than those of the thorax, distance from the inner hind angle to the thumb joint exceeding half the length of the thumb; inner edge, with that of the thumb, scabrous, with short spines; *fingers* equal, fasciate with green near the tips; *caudal lamellæ* deeply ciliated, first segment of the middle one two-spined each side at tip, lateral ones with an elevated longitudinal line.

Length from tip of the rostrum to the tip of the tail, nearly three inches and three tenths—breadth of the thorax nine tenths.

This inhabitant of our rivers does not appear to have been noticed as a distinct species; it is larger than the preceding, and very different in the form of the rostrum, and in other characters, which will be obvious from the above descriptions; it approaches much nearer to the *A. fluvialis* of Europe, to which indeed I should be induced to refer it, but that the hands are not tuberculated as those of that species are described to be. It is known to fishermen by the name of “Craw-fish,” not being distinguished by them from the preceding.

Observations on several species of the genus ACTINIA;
illustrated by figures. By C. A. Le Sueur. Read
December 9, 1817.

(Concluded.)

2. *A. ultramarina.* P. and L. (Plate VII. fig. 5.)
Twenty segments; tentacula short; colour a fine ultrama-

rine; several ranges of tubercles, resembling pearls, on the borders.

This species, when it expands, assumes the form of the *A. olivacea*; the colour constitutes the greatest difference between them. The figure, in the plate, represents it in the act of expanding; and gives it of its natural size.

Inhabits the Southern ocean; discovered in lat. $36^{\circ} 30'$.—long. 28° west.

It was the specimen here described on which Mr. Cuvier constituted his genus *Minyas*, of Le Règne Animal, tome 4, p. 24, pl. xv. fig. 8; but the observations of this author were made on the animal preserved in alcohol; my description and figure were taken from the *living* animal, on board the corvette *Geographe*, at the place indicated above.

3. *A. flava*. P. and L. (Plate VII. fig. 8.) *Body* narrow, the base expanding in a form resembling a turban; *furrows* numerous and narrow; *tentacula* open at their extremity, and diaphanous.

One cannot perceive, in this species, the punctured tubercles which are conspicuous in the preceding. The *body* is of a yellow colour; the *disc* is white, reddish at its summit, and conic. The figure in the plate is of the size of nature.

Inhabits the Southern ocean; discovered in lat. $34^{\circ} 30'$.—long. 6° west.

4. *A. hyalina*. *Body* diaphanous, soft, with several longitudinal lines; *tentacula* longer than the body, of a reddish colour, deeper in the centre, and furnished with verrucose annulations, four lines in length. Inhabits the Atlantic ocean; and attaches itself to fuci.

5. A. *tricolor*. *Body* soft, fleshy, of a fine orange colour; *base* enlarged, furnished with several ranges of perforated tubercles; periphery of the *mouth* with a circle of blue, and another of orange.

Tentacula diaphanous, unequal, conic, shorter than the body, placed equidistant, in five ranges, the shortest on the border, the longest in the centre, furnished with four or five rows of small tubercles, and brown oblong spots, alternating with the oval yellow ones; this *mouth* is surrounded with tubercles. The young of the species are more diaphanous than the old; *size* about an inch in diameter. Inhabits the island of Barbadoes; and attaches itself to those shells which are tenanted by the Hermit Crab.

6. A. *bicolor*. *Body* divided longitudinally by brown and white bands; the centre *tentacula* pointed, with a row of white spots on the superior part.

The *body* is fleshy, soft; *base* extended, furnished with several rows of tubercles; the *mouth* reddish; the brown bands of the body are ornamented with small white lines; *tentacula* unequal, placed in four rows, alternating with each other, the smallest at the margin; *height* and *diameter* about six or seven lines. Inhabits the bay of the island of St. Vincent; and is found adherent to shells.

7. A. *rapiformis*. *Tentacula* short, cylindric, equal, disposed in four rows; *body* fleshy, very contractile, assuming different forms, and frequently those of a turnip, and a pear, the former of which it also resembles in its dull, opaque, white colour; when contracted, it is of a subglobular form. The young are more transparent than the old, and are sometimes of a darker colour.

This species dwells in the sand of the coasts of the United States; and raises its head above the common surface for the purpose of displaying its tentacula; when contracted, in its habitation, it is concealed below the surface. The individual described was an inch and a half in diameter, and four or five inches in length. Discovered at Egg-harbour, on the coast of Newjersey. It is necessary to observe that this *Actinia* is frequently disturbed in its habitation by the waves of the ocean, and is found washed on the sands; in this event, a common observer would take it for a rotten pear, or something similar.

8. *A. marginata*. Eight or nine rows of *tentacula*, which are short, slender, equal, placed on a large expansion, the plaits whereof present ten or twelve large lobes; the border of the upper extremity of the *body* is large, and encloses the tentacula when contracted, which are disposed in a quincunx order, and smooth, pointed, and of a pale reddish colour; the mouth is plaited.

The animal, when unfolded, presents a branchial *disc*; the colour of the *body* is burnt terra de siena; in *diameter* and *length* about one inch and a half. Inhabits Boston-Bay, in the cavities of rocks, below fuci.

9. *A. annulata*. *Tentacula* pointed, unequal, divided by eight or nine rings, which are white, and elevated like embossment, they are disposed around a narrow disc.

Body tubulous, long, straight, very contractile, assuming different forms; the centre *tentacula* are about six or eight in number, and very long, the remainder of the tentacula, as they approach the margin, diminish to about half the length of those of the centre; *length* about two or

three inches, *diameter* about two or three lines; *colour* diaphanous.

Inhabits the shores of the island of Barbadoes, in the hollows formed in madrepore rocks.

10. *A. solifera*. *Tentacula* very long, unequal, pointed; pressed together in five or six rows, around a straight disc, these tentacula are ornamented with white, semispiral spots, terminated in a point at the end.

Body very much elongated, cylindric, very contractile, fleshy, marked with longitudinal striæ, of a reddish colour; *mouth* large, plaited, ornamented with two yellow bands, placed opposite to each other, but not surrounding it, its circumference is white; tentacula very transparent, those of the centre longer than those of the margin.

Indabits Guadalupe, in old shells, particularly in those of the *Turbo vesicolor?* The *body*, when dilated, is about nine or ten lines in diameter, and about four inches in length.

11. *A. granulifera*. *Body* covered with verrucose tubercles; four rows of *tentacula*, equal, narrow and pointed; border of the *margin* furnished with tubercles, which are surmounted with small white pedunculated warts.

Body equal, cylindric, contractile, of a red colour, with longitudinal bands of a pale red; *tentacula* smooth, the third part of the length of the body, of a violet brown, annulated with white, and with white roundish spots, which have sometimes a white spot in their centre; the margin is bordered with white tubercles, in the form of a festoon, the base of these tubercles black; *diameter* of specimen described one inch, *length* two inches.

Inhabits the rocks at Martinico.

12. A. *flosculifera*. *Tentacula* crowded together in three rows, placed midway between the mouth and the margin of the disc; *margin* furnished with several rows of tubercles, surmounted with small warts; *body* fleshy, contractile, smooth, with several series of pores, separated by small lines.

Margin and centre of the *disc*, and *tubercles*, of an umber colour; *tentacula* of the same colour, but paler, furnished with several oblong white spots, with a blackish brown point in the centre of each spot.

Inhabits the shores of the island of St. Thomas, in the sand; it is likewise found in the crevices of rocks. Diameter about two inches.

13. A. *denticulosa*. *Tentacula* very short, obtuse, disposed in contiguous lines, in the form of rays on the disc, the largest at the margin, the smallest very near the mouth.

Body soft, of a feeble contraction; *disc* very large, variegated with fine blue, yellow, red and violet colours, intermingled, and ornamented with several series of *tentacula*, of the same colour as the disc, the longest of which tentacula are about eleven in number, the intermediate ones are five or six, and shorter; the *mouth* is not plaited, its circumference is of a greenish yellow colour; *diameter* three or four inches, *height* about two inches.

Inhabits amongst the marine plants, in the sand, at the island of Barbadoes.

14. A. *crucifera*. *Tentacula*, at the margin, very numerous, in a simple row, furnished with several transverse

tubercles; centre of the *disc* covered with numerous small tubercles.

Body very soft, of a weak contraction; *disc* very large, of a yellow colour, and reflected, bordered with white, and greenish in the centre; *tentacula* pointed, smooth, entire below, the transverse tubercles enlarged at their extremities, sometimes bilobated; base of the tentacula black, furnished with ranges of tubercles, larger than those which cover the disc, placed in the form of rays; *tentacula* reddish brown; transverse *tubercles* white; exterior margin furnished with several rows of perforated tubercles.

Inhabits in the midst of marine plants, attached to stones, on the sand banks of the island of Barbadoes. Diameter two inches and a half.

15. *A. osculifera*. *Disc* furnished with five principal rows of tubercles, and other intermediate ones, surrounded by a large margin, which is smooth, and terminated by short, unequal tentacula; *mouth* small, plaited and produced.

Body short, with several rows of perforated tubercles, of a burnt-umber colour; five yellow lines passing from the mouth to the margin; the disposition of the tuberculated rays of the *disc* is as follows: five principal ones, five shorter intermediate, ten still shorter between the last; each large tentaculum of the margin ornamented with a yellow line.

This species, like the preceding, ejects water through the exterior perforated tubercles; *tubercles* of the disc surmounted with several small pedunculated warts; colour of the *body* reddish, which varies in different specimens; *diameter* one inch and a half.

Inhabits the madrepore rocks, at the bottom of the bay of St. Thomas, united in large groups.

It was my intention to class all the animals described in this paper under the generic title of *Actinia*; but I have since thought it expedient to arrange the three following species under the genus *Zoanthus*, instituted by the Chevalier Cuvier, in his excellent work, recently published, *Le Règne Animal*. The following are the characters laid down by this author:

Genus ZOANTHUS.

The animals of this genus have the same fleshy skin, the same disposition of mouth and tentacula, as those of the *Actinia*; they have likewise an organization nearly similar; but they are united in numbers more or less considerable, on a common base, sometimes in the form of creeping roots, sometimes spreading over a large surface.

1. *Z. sociata*. *Tentacula* numerous, yellow, short; *disc* greenish; *peduncle* very long and slender, and of a violaceous brown colour.

The *body* of this species is smooth, slightly striated longitudinally, and transversely, by the muscles; the *tentacula* are smooth, placed in two rows, and about sixty in number; *mouth* small, linear.

The animals of this species reside in communities, united by the base of their peduncles, on a tube or root, which penetrates below rocks; and they extend their discs in the interstices, on a line with the common surface.

Inhabits Guadalupe. Perhaps this species is the *A. sociata* of Ellis and Solander, page 5, pl. 1, fig. 1.

2. *Z. Solandri*. (Plate VIII. fig. 1.) *Disc* of a deep reddish brown colour; *tentacula* short, sixty in number; *peduncle* of a reddish yellow; when the animal is contracted the summit is marked with deep blue angular spots, and white lines.

This species is also united in groups, by the base of their peduncles, amid the sand, at the surface of which they raise their discs. Length about two inches. *Tentacula* about sixty in number.

Inhabits St. Thomas.

3. *Z. dubia*. Centre of the *disc* green; *tentacula* and *mouth* yellow. *Tentacula* placed in two rows, and very numerous; *body* cylindric, pedunculated, reddish.

This species differs from the *sociata* chiefly in its size, which is about one third part less, and by its habitudes, it being found in bunches, closely united, attached to various marine bodies, such as fuci, &c. and is constantly exposed, in all its parts, to the action of the water, whilst the former conceals itself in the crevices of rocks. These circumstances have induced me to record it as a distinct species.

Inhabits Guadalupe.

The characters of the genus *Zoanthus*, as laid down by Mr. Cuvier, embrace the two following animals; but it is necessary to observe that they differ as much from the *Zoanthi*, as these differ from the *Actiniæ*. I shall propose a new genus, under the name of *Mammillifera*.

Genus MAMMILLIFERA.

A large cuticular expansion, serving as the base of numerous animals, which, when contracted, assume the form of mammæ.

1. *M. Auricula.* (Plate VIII. fig 2.) *Disc* greenish, *tentacula* 26 to 30 in number, reddish; *mouth* small and whitish, of a deep green colour.

Body short, cylindric, of a reddish colour; the expansion of the base, and of the body, is fleshy, and covered with mucus.

These animals cover, by their large expansion, the rocks at the entrance of the ports of St. Vincent and Dominica.

2. *M. Nymphæa.* *Disc* yellowish, a green circle at the base of the *tentacula*, which are placed in two rows, and about fifty in number, of a light brown; *mouth* rosaceous.

Body yellowish red, short, fleshy, and contractile, as in the preceding species; the *mouth* is divided, on each side, by four or five plaits, and rises in the form of a button.

The habits of these animals are similar to those of the foregoing species. Found at the island of St. Christopher.

The animals of the genus *Corticifera* are distinguished from the preceding, inasmuch as the former are enclosed in cellules of sand, agglutinated, the cellules are likewise agglutinated their whole length, and form a corticiferous expansion.

1. *CORTICIFERA glareola.* (Plate VIII. fig. 6, 7.) *Disc* deep violet, whitish at the centre; *tentacula* twenty-

four in number, of a grayish red; *cellules* very short, and as long as broad. This species covers the volcanic rocks of Pointe noir, at Guadalupe.

2. *C. flava*. (Ellis and Solander; page 180, n. 6, *Alcyonium ocellatum?*) *Tentacula* yellow; centre of the disc yellowish; *cellules* three times as long as broad.

When the animal is contracted, one distinguishes several radiated lines proceeding from the aperture; when the animal is expanded it presents the same aspect as the foregoing.

Inhabits the island of St. Thomas.

One may easily perceive that the foregoing described animals, which I have thought it advisable to class under four genera, may be collected into one family, under the common name *Actinia*. It is thus that I have arranged them in a table, which, at present, I want room to publish.

I shall now give a description of three madreporic animals, of different genera, in order to show their affinity to the preceding.

CARYOPHYLLIA solitaria. (Plate VIII. fig. 10.) *Cellules* cylindric, generally insulated, radiated in the centre, furrowed on the exterior; *animal* diaphanous, ornamented with twenty-two *tentacula*, which are thick and short, and covered with white spots, twelve of these *tentacula* are annulated with red at their extremity; aperture of the *mouth* linear, marked with three black bands on each side, those of the middle largest.

Whilst the animal is expanded, it rises partly out of its habitation, and elevates its mouth beyond its *tentacula*.

Inhabits the madreporic rocks of Guadalupe.

MEANDRINA labyrinthica. (Plate VIII. fig. 11.) A calcarious mass, deeply and irregularly furrowed, constitutes the dwelling of this species.

The animals are found at the bottom of the furrows; *mouth* with six plaits on each side, encircled with red and yellow, mingled with green; the *tentacula* are from eighteen to twenty in number, long, red, with small white spots; the membranaceous expansion, which covers the furrows of each side, are brownish red.

Inhabits the island of St. Thomas.

ASTREA dichotoma. (Plate VIII. fig. 12.) A calcarious mass, divided in a dichotomous manner, thick, irregular, bearing at its summit the last stratum of *cellules*, which are small, hexagonal, irregular; *animal* reddish, furnished with twelve *tentacula*, of a middling size, and white; *mouth* small, oval; centre of the *disc*, and the *body*; reddish; the animal, as in the foregoing, when expanded, rises greatly beyond its cellule.

Inhabits the island of Nevis.

ANATOMICAL DESCRIPTIONS OF SEVERAL OF THE FORE-GOING ANIMALS.

Actinia ultramarina. (Plate VII. fig. 4, 6.) A section of this animal, cut vertically, whilst it is contracted, presents a half sphere, flattened at its extremities. Its skin, though not thick, is strong and coriaceous, and forms several cavities. If one takes the animal in its swimming position, the first cavity is that which contains the air-bladder disk; this cavity is smooth, without any other appearance of an opening than the upper one, which is capable of being dilated or contracted. I was not ena-

bled to see in the interior of this cavity any small mucous orifices, for the purpose of furnishing the pellucid substance of the air-bladder; or whether it had any communication with the other cavities, from which the superior one is separated by a thick skin. The second cavity is divided by twenty or twenty-two pairs of membranes, situated at each junction of the exterior division, which membranes pass from one extremity to the other, and support in the middle of this cavity a cylindric, plaited organ, open at its extremities, appearing to be destined to supply the functions of the stomach, and forming compartments between it and the internal side. Each membrane is furnished with a thick, opaque, arcuated organ, curved at its sides, one extremity prolonged in the manner of rays, on the bottom of the cavity of the disc, and the other attached to the base of the stomach. Some of these organs bear the ovaries, which are opposed to each other like two c's placed thus c o . These ovaries are ample, very much plaited, and divided into deep lobes, which are themselves also lobed at their extremities, on which lobes one distinguishes granulations, similar to eggs. We may regard as a third cavity, that, comprehended between the central aperture, which is named the mouth, and the exterior border; this cavity serves to secure the tentacula, which are drawn in when the animal contracts itself. The mouth, in several species, remains contracted, when the ovaries are slightly expanded; but in this species the ovaries are very much expanded, and expelled without the body, by its contractions, after having passed the two openings of the stomach, and give a false appearance of tentacula. At the opening of the mouth one remarks several fleshy appendices, some united, and others simple and separated.

The circumference of this last cavity is furnished with strong cylindric muscles, which act, like strings to a purse, in drawing the borders together.

The exterior tubercles, which are very apparent on the divisions, seem to establish a communication between the internal and external parts, and admit the water into the cells formed by the interior membrane. I had an opportunity of observing, in several species of *Actinia*, the water ejected through similar apertures, when the animals contracted themselves. The air-bladder disc is formed of a multitude of small membranes, placed one on another, the largest at the upper part, the rest diminishing in size to the point where this disc is in contact with the bottom of the cavity; its membranes in this place are solid, and pressed together, particularly towards the centre, where is a small conic, hard, opaque nucleus, whence these membranes seem to have their origin, and form the disc. This air-bladder disc is easily separated from the cavity which encloses it.

Actinia flava. (Plate VII. fig. 9.) The interior organization of this species resembles somewhat that of the preceding. The ovaries are attached equally to the strong organ of longitudinal fibres, they are folded on the same, and when they open one perceives numerous small transverse fibres, with a yellow substance which fills them. On their borders rise a very plaited membrane, whereon one can distinguish small granulations, resembling eggs. The stomach is equally surrounded, and supported, by this organ and its membranes, forming as many cells, which are prolonged as far as the end of the tentacula, which have at their points a small aperture; these small apertures are analogous to those which are situate on the

sections of the other species. At the opening of the mouth one distinguishes several pairs of fleshy appendages; between those of the interior are several plaits. The interior aperture of the stomach is furnished with small membranes. The air-bladder disc resembles much that of the *A. ultramarina*, but it rises conically, and is yellow at its summit; in the other species this disc is flat.

Zoanthus Solandri. (Plate VIII. fig. 1.) The body of this animal is conic, and long, and hollowed through its whole extent, its base being in the form of a root. This body is composed externally of a strong coriaceous tunic, which becomes finely wrinkled by the contraction of the muscles; beneath this there is a second tunic, weaker and transparent; and beneath this last a third tunic, which is membranaceous, and presents towards the superior region a vascular reticulation. To this last tunic are attached about sixty pairs of white filaments, each pair united by straight membranes, twenty of which bear ovaries, which are brown and very short. These ovaries appear to rise from as many thick, arcuated organs, striated in annulations, folded on each other, and divided, through their whole length, by a small canal. The colour of this organ is opaque yellowish white; it is attached, by its upper part, to the base of the stomach, which is plaited, and very short, compared with the length of the animal; it is placed in the centre, and supported by the membranes which form the cells, as in the preceding species. It is equally furnished with two apertures, the upper one is the mouth, and the other communicates with the internal parts of the body.

Mammillifera Auricula. The body of this species is short, conic, soft, and covered with a smooth skin. The

interior conformation of this animal is similar to that of the preceding; one equally remarks a stomach, plaited longitudinally, and transversely, supported in the centre by a great number of membranes, which are prolonged from the summit to the base, twenty-seven of which are entire, and support the serpentiform ovaries, which have their origin at a thick, cylindric, striated, arcuated organ: this organ is prolonged, and attached to the inferior aperture of the stomach. A section of this animal, cut horizontally, presents us with the peculiar disposition of the interior membranes, which will be better comprehended by a reference to the figure in the plate, than by a verbal detail.

Corticifera glareola. (Plate VIII. fig. 8, 9.) One observes in this species an analogous organization to that of the foregoing. This organization is enclosed in cellules, which are short, cylindric, composed of sand, agglutinated by a gelatinous substance. These cellules are slightly contractile at their aperture, which is situate at a small button in the centre. The base, whereon these cellules are placed, is composed of sand, about one third part of the height of the cell. The interior of the cell is divided by eighteen or twenty white filaments, which extend from the summit to the base. They adhere to a transparent membrane, which guards the interior of the cell. In the centre is a cylindric, plaited organ, open at both ends, supported by the membrane which bears the ovaries. From the lower aperture of this organ, extends another, which is thick, striated in annulations, and arcuated. The ovaries are very conspicuous, and united at their base; they are protected by white filaments, which border the membrane of the interior, towards the centre of the ani-

mal. On one of the sides of the stomach, one distinguishes a small expansion, the object of which organization I have not been enabled to discover.

The crust whereof these animals form their habitations, appears to be constructed of successive layers of sand, the base of which is augmented in proportion as the animal advances in its labours.

This species is that which approaches nearest to the madrepôres, not only in its external form, but in the permanency of its envelope, and its large expansion.

After the examination that I have made of the animals above mentioned, we perceive that they are furnished with a skin or covering, more or less susceptible of contraction or dilatation, enclosing an organization constructed on the same system, but modified, according to their particular habits. We perceive that they are all provided with tentacula, analogous to arms, fit to seize and retain their prey; with an alimentary sack, open at both extremities, surrounded at its base with several arcuated organs, which may be considered as performing the functions of the liver. The membranes which intersect the interior of the body, may be equally compared to gills, which receive the water admitted by the two openings of the stomach; this water may pass out through the same openings, or by the exterior tubercles, as in the *A. olivacea*, and the *A. ultramarina*, or at the extremity of the tentacula, as in the *A. flava*. The white filaments which support the interior membranes, are analogous to those considered as nerves, by Dr. Spix, in the *A. coriacea* of Europe. (Ann. des Muséum, tome 13, p. 443.) These nerves have equally their origin in the base of the animals described above. It is easy to conceive that the stomach, having apertures at its

two extremities, has the power of closing one, whilst the other remains open, or keeping both open in order that the eggs or young may be excluded, when the animal contracts itself. Several naturalists have observed that the young are excluded in a perfect state; but further their observations have not extended. We owe to Dr. Spix some interesting details on this subject; and my own observations will throw, perhaps, some additional light on it. I will still remark, that the ovaries, being greatly multiplied in these animals, fill the cavity which contains them. If one tears or separates an individual, to the parts thus separated will adhere more or less ova, which, at a certain period of their growth, will be productive of young; and one ought to be well assured of the total absence of eggs, before adopting the opinion that parts of these animals possess a reproductive faculty, as was maintained by the abbé Dicquemare, in the *Journal de Physique*. But I think that the experiments of this author deserve to be repeated, as this is a subject exceedingly interesting. The ingenious memoir of Dr. Spix being often cited by Messrs. Cuvier and Lamarck, induced me to believe that the history of the Actiniæ was tolerably complete; and hence, I neglected to examine the interior of the large species which inhabit the West Indies. But in consequence of the observations recorded above, there is reason to believe that the Actiniæ described by Dr. Spix, and those described by myself, have a similar conformation of the stomach. That the form and the disposition of the exterior parts of the Actiniæ, taken in succession, present an approximation to the Madrepores, will be evident from an examination of the figures 2, 4, 6, 7, plate

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viii. compared with the figures 10, 11, 12, which represent the madreporic animals, *Caryophyllia solitaria*, *Meandrina labyrinthica?* and *Astrea dichotoma*.

EXPLANATION OF THE PLATES VII. AND VIII.

PLATE VII.

- Fig. 1. *Actinia olivacea*, expanded, as it swims.
Fig. 2. The disc of the same.
Fig. 3. Tentacula, magnified, of the same.
Fig. 5. *Actinia ultramarina*, beginning to expand.
Fig. 6. Vertical section of the same: *a*, cavity of the air-bladder disc; *b*, air-bladder disc; *c*, great cavity containing the ovaries; *d,d*, the stomach; *e,e*, the tentacula contracted; *f*, section of lateral organ.
Fig. 4. Horizontal section of the same: *a*, chamber which separates the great cavity; *b*, extremity of lateral organ; *c*, the ovaries; *d*, point of junction of the interior organs with the exterior furrows; *f,f*, striæ of the plaits of the divisions.
Fig. 7. *a*, Portion of the mouth viewed above.
Fig. 8. *Actinia flava*, in its natural position, when swimming.
Fig. 9. Profile of the same, opened on the side: *a,a,a*, ovaries turned over the air-bladder disc; *b*, transverse striæ of the interior longitudinal organs; *c*, section of a tentaculum; *d*, stomach.
Fig. 7. *b*, Portion of the mouth and stomach of the same, magnified.

PLATE VIII.

Fig. 1. *Zoanthus Solandri*: three individuals united together. In a section of one of them one sees at *b*, the cavity in which the tentacula are contracted; *a*, cavity of the stomach; *c*, the ovaries; the foregoing letters *a*, *b*, are placed on one of the membranes which forms the interior chamber.

Fig. 2. A group of *Mammillifera Auricula*.

Fig. 3. Horizontal section of the same, which shows the comparative size, and the number of the interior membranes.

Fig. 4. Oblique section of the same.

Fig. 5. A detached part of the same: *a*, lower aperture; *b*, one of the interior membranes; *c*, arcuated organ; *d*, nervous filaments; *e*, upper aperture or mouth; *f*, ovaries.

Fig. 6. A group of the *Corticifera glareola*.

Fig. 7. This figure represents two individuals of the same, one seen in front, the other in profile.

Fig. 8. Vertical section of the same.

Fig. 9. A detached portion of the same: *a*, lower aperture; *b*, interior membrane of the chamber; *c*, arcuated organ; *d*, appendix of the stomach; *e*, mouth; *f*, horizontal section; *g*, ovaries; *i*, filaments or nerves.

Madreporic Animals.

Fig. 10. *Caryophyllia solitaria*: *a*, animal seen in profile and expanded; *b*, the expanded animal viewed from above, magnified.



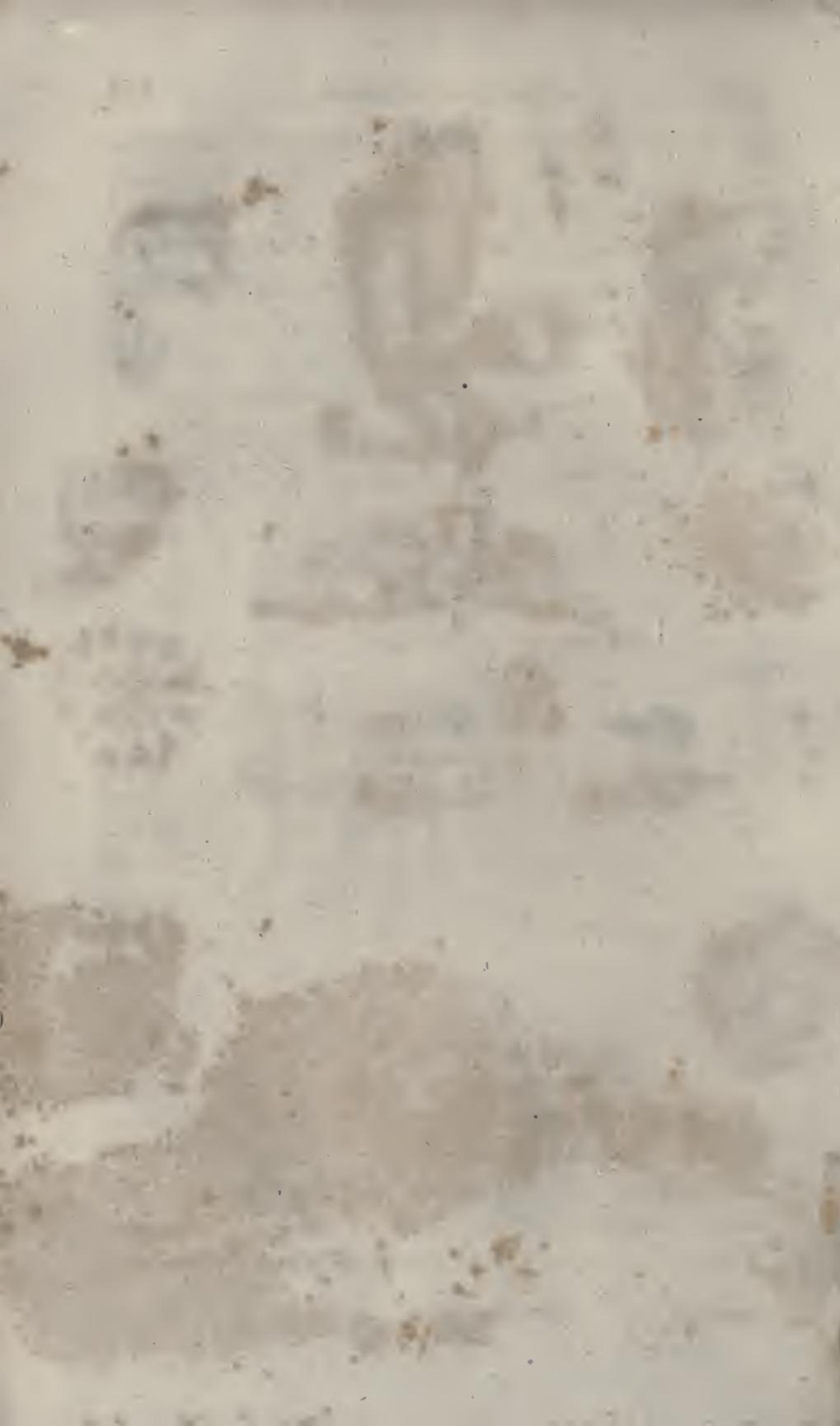


Fig. 11. *Meandrina labyrinthica*: *a*, several expanded animals united, of the natural size; *b*, profile view of an animal, magnified.

Fig. 12. *Astrea dichotoma*: *a*, expanded animal, seen in profile; *b*, the same viewed from above, both greatly magnified.



Description of COLLINSIA, a new genus of plants.
By Thomas Nuttall.

In the spring of 1810, during the course of an extensive journey into the north-western interior of the territories of the United States, I first became acquainted with the very singular and interesting plant which forms the subject of the present memoir. The specimens which I then obtained on the alluvial soils of the Alleghany and on the borders of lake Erie were finally lost. On arriving at St. Louis, near the confluence of the Missouri and Mississippi rivers, I found that Mr. John Bradbury, a botanist, had also detected this plant about the same time, on the banks of the Missouri and Mississippi, but I saw no specimen. In the spring of last year (1816), having undertaken a tour to the western states, I determined, if possible, again to collect this neglected plant, but after a journey of more than a hundred miles, for scarcely any other purpose, I arrived at Pittsburgh disappointed of my object. On descending the Ohio, however, nearly to Galiopolis, I at last recognised it on the more open alluvions of the river, withered and nearly past affording seed, accompanied by the *Hesperis pinnatifida* and the interesting *Phalangium esculentum*: from these seeds I have been at last fortunate enough

to obtain the plant from which the accompanying drawing was taken by my friend, Mr. C. A. Le Sueur. This plant has for several years been known to Dr. Drake of Cincinnati, in whose collection I saw specimens of it, and also with Dr. Short of Lexington, Kentucky, two gentlemen, who, amidst the avocations of an irksome profession, have still found leisure to cultivate some of the branches of natural science.

I have dedicated this genus to the name of Zaccheus Collins, Esq. of Philadelphia, a gentleman, whose talents as a botanist and a mineralogist are deservedly acknowledged.

Linnæan CLASS and ORDER.

DIDYNAMIA ANGIOSPERMIA.

Natural Order. ANTIRRHINEÆ.

Genus COLLINSIA.

Calyx quinquefidus. *Corolla* bilabiata clausa; labio superiore bifido, inferiore trifido; lacinia intermedia, carinato-saccata genitalia arcte tegens. *Capsula* rotunda, subunilocularis, subquadrivalvis. *Semina* duo vel tria.

Planta annua; folia opposita et verticillata, integra; pedunculi verticillati axillares, uniflori.

COLLINSIA verna.

Description. Root fibrous, annual. Stem often simple or branched towards the base, terete, nearly smooth, about twelve inches high. Radical leaves petiolate, roundish, or obovate-spathulate, denticulate; stem leaves ovate or ovate-lanceolate, sparingly denticulate and somewhat scabrous on the margin, sessile, and subamplexicaule, sometimes a little pubescent, but usually smooth; floral

leaves verticillated in threes, fives, or sixes, ovate-lanceolate or linear-lanceolate acute and mostly entire, diminishing upwards to the size of mere bractes. Peduncles 1-flowered, axillary, commencing usually to appear with the third pair of leaves, filiform, nearly erect and somewhat pubescent, about an inch in length. Calyx subcampanulate, cleft more than half way down and membranaceous at the base; segments greenish, semi-lanceolate, acute, the two lower laciniæ horizontally divergent. Corolla nearly in the form of a violet, bilabiate, closed; upper lip white, spirally reflected, bilobate with a small, prominent arched palate of a yellow colour spotted with saffron; all the lobes of the flower obovate and emarginate; lower lip trifid, bright azure blue, lateral segments horizontally deflected, coalescing with the central lobe, which appears in the form of a closed carinated sacculum including the stamina and style, and rarely opening except for an instant when irritated apparently by heat, as with many of the *Hedysarums*; tube of the corolla short and gibbously curved, forming with the sacculum an oblong canal. Stamina didynamous, all arising from the lower lip; anthers yellow, horizontal: the rudiment of a fifth stamen at the base of the corolla tube. Style long and capillary; stigma scarcely any. Germ 4-seeded. Capsule round, acute, shorter than the persistent calyx by which it is inclosed; partly 1-celled, and 4-valved, by abortion 2 and 3-seeded; valves opening rather more than half way down, where undivided, uniting with the small and imperfect receptacular dissepiment; only about a third part of the capsule is divided by a partition. Seed brownish, oval, or elliptic, convex on the outer side, inner side umbilically perforated; externally a little rugose and reticulately punctured; (about the

size of mustard seed.) Corculum flat, and erect, greenish; radicle inferior. Perisperm cartilaginous, including the corculum, perforated in the centre on the inner side, by which orifice the seed is attached to the receptacle.

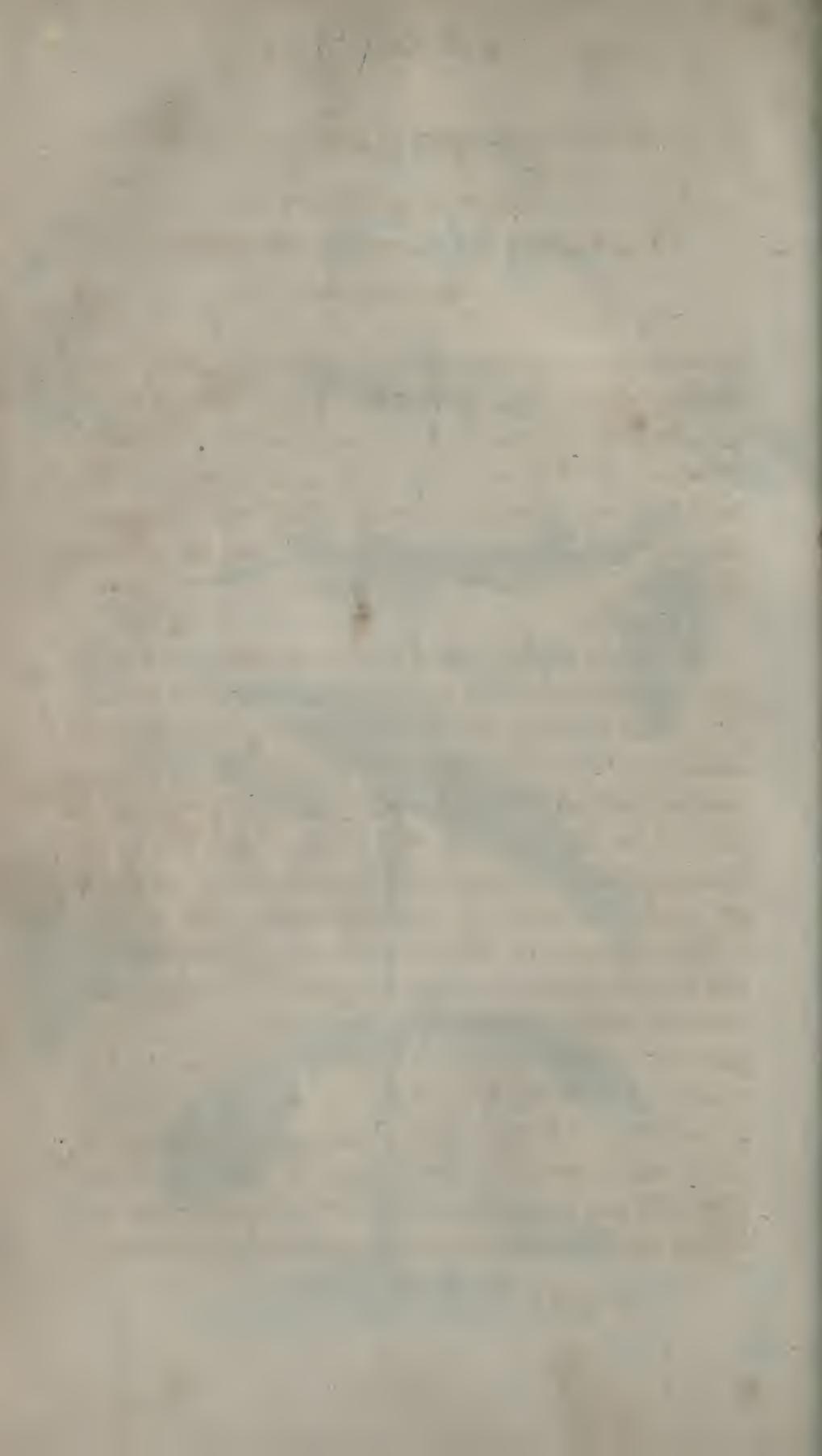
Time of flowering, about May. The definite number of seeds, about 3, or primarily 4, as is observable on examining the germ, the indistinctness of the capsular valves also the same number, and the obliteration of the dissepiments, are circumstances, independent of the extraordinary form of the corolla, which deviate remarkably from the genuine character of the *ANTIRRHINÆ*, and approximate this plant in a manner towards the *LABIATÆ*. Notwithstanding the situation which it appears thus to hold betwixt these two orders, its place appears to be immediately after the genus *Anarrhinum* of Persoon's Synopsis.

EXPLANATION OF PLATE IX.

COLLINSIA.

- a. A view of the flower in profile (natural size.)
- b. The same seen in front.
- c. The same opened and somewhat magnified, exhibiting the disposition of the stamens in the sacculum when expanded.
- d and e. The anther.
- f and g. Views of the capsule.
- i and k. The seed.
- l. The corculum.





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AN ACT
TO INCORPORATE THE
ACADEMY OF NATURAL SCIENCES
OF PHILADELPHIA.

WHEREAS it is represented to the legislature that a number of persons have formed a society in Philadelphia for the encouragement and cultivation of the sciences, by the name of "The Academy of Natural Sciences of Philadelphia," as a society devoted entirely to the advancement of useful learning, and in order that the purposes thereof may be carried into better effect,

Therefore,

SECTION 1. *BE it enacted by the senate and house of representatives of the commonwealth of Pennsylvania, in general assembly met, and it is hereby enacted by the authority of the same,* That all such persons as now are members of said society, according to its rules heretofore adopted, or that hereafter may become members of the same, agreeably to its rules and regulations, be, and they are hereby incorporated into a society by the name of "The Academy of Natural Sciences of Philadelphia," and by that name shall have perpetual succession, with power to have a common seal, and change the same at pleasure, to make contracts relative to the said institution, to sue and be sued, and by that name and style be capable, in law, of purchasing, taking, holding, and conveying, any estate, real or personal, for the use of said corporation: *Provided*, that the annual income of such estate shall not exceed in value eight thousand dollars, nor be applied to any

other purposes than those for which this corporation is formed.

Sect. 2. *And be it further enacted by the authority aforesaid,* That the society may establish by-laws and orders for its government and regulation, and for the preservation and application of the funds thereof: *Provided* the same be not repugnant to the constitution and laws of the United States, or of this Commonwealth.

Sect. 3. *And be it further enacted by the authority aforesaid,* That the society shall consist of members and correspondents, and candidates for admission shall be elected under such rules, and upon such terms, as the society shall establish, aliens shall enjoy the full rights of members, or correspondents in the society, but members only shall have the right of voting, of holding offices, and of transacting business, and correspondents shall have the privilege of attending the meetings, and visiting the museum.

Sect. 4. *And be it further enacted by the authority aforesaid,* That the officers of the society shall be a president, two vice-presidents, a corresponding secretary, a recording secretary, a treasurer, a librarian, and four curators, whose respective duties may be assigned by the by-laws of the said society, and they shall be elected at the last stated meeting of the society in December, in each year, and if any office should become vacant, it may be supplied by a special election, until the annual election then ensuing; and until the next annual election for officers in the month of December one thousand eight hundred and seventeen the present officers are hereby vested with power to perform the duties prescribed by the existing rules of the society, unless there be intermediate vacancies, and then the officer or officers

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to be elected, shall have the full power of his, or their predecessors.

Sect. 5. *And be it further enacted by the authority aforesaid,* That if the annual election for officers shall not be held at the stated day, the said corporation shall not be thereby dissolved, but the officers shall continue in office until a new election.

REES HILL,

Speaker of the House of Representatives.

ISAAC WEAVER,

Speaker of the Senate.

Approved, the twenty-fourth day of March, one thousand eight hundred and seventeen.

SIMON SNYDER.

Office of the Secretary of the Commonwealth,
Harrisburg, April 25th, 1817.

I certify that the above and foregoing is a true copy of the original law remaining on file in this office. Witness my hand and seal.

JAMES TRIMBLE, [L.s.]

Deputy Secretary.

CONSTITUTION

OF

THE ACADEMY OF NATURAL SCIENCES.

CHAPTER I.

Art. 1. THE society shall be called "The Academy of Natural Sciences of Philadelphia."

Art. 2. The society shall consist of members and correspondents.

Art. 3. Candidates for admission into the society, whether as members or correspondents, must be proposed, in writing, at least one meeting before their election, and be chosen by three fourths of the members present.

Art. 4. No person residing in Philadelphia can be chosen a correspondent; nor shall any correspondent continue such, after having removed permanently to Philadelphia.

Art. 5. The right of voting, of holding offices, and of transacting business, resides solely in the members; correspondents have only the privilege of attending the meetings, and visiting the museum.

Art. 6. Every member, on his admission into the society, shall sign the following declaration:

"In becoming a member of the Academy of Natural Sciences of Philadelphia, I promise to conform myself to its constitution, laws, and regulations; and in testimony of this declaration I do hereunto subscribe my name."

CHAPTER II.

Art. 1. The officers of the Academy shall be a president, two vice-presidents, a corresponding secretary, a recording secretary, a treasurer, a librarian, four curators, and three auditors.

Art. 2. The election of officers shall be held on the last stated meeting in December.

Art. 3. The duty of the president is, to occupy the chair, and regulate the order of the society during its meetings.

Art. 4. The duties of the vice-presidents, are the same as those of the president, in his absence.

Art. 5. The duty of the corresponding secretary is to maintain and conduct the correspondence of the Academy.

Art. 6. The duty of the recording secretary is to take and preserve correct minutes of the proceedings of the Academy, and to notify members of their election.

Art. 7. The duty of the treasurer is to take charge of the funds of the society, and to attend to the collection and payment of monies; he shall give, if required, security for the faithful performance of his duties.

Art. 8. The duty of the curators is to take charge of the museum, and apparatus, belonging to the company.

Art. 9. The duty of the librarian is to take charge of the books belonging to the society.

Art. 10. The auditors shall, in connection with the treasurer, have the superintendance of the monied transactions of the Academy.

Art. 11. Besides the duties above specified, the officers are bound to perform all such other duties, naturally

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belonging to their respective stations, as are referred to in the constitution and bye-laws, or may be prescribed from time to time by the society.

CHAPTER III.

Art. 1. The stated meetings of the Academy shall be held on Tuesday evening of every week, at such hour as shall be agreed upon from time to time.

Art. 2. Special meetings may be convened by resolution of the society, or by public notice from the president.

Art. 3. The last stated meeting in the month shall be called a meeting for business, and shall be appropriated to the elections, the enacting and altering of laws, the fiscal arrangements, and, in general, to all such business as does not belong to the scientific transactions of the society.

Art. 4. All the stated meetings, except the last in the month, shall be called ORDINARY MEETINGS, and shall be devoted to scientific pursuits, such as written and verbal communications, lectures, discussions, and the receiving of donations for the museum, apparatus, or library. In cases of urgency, however, other business may be called up by special resolution.

Art. 5. Six members shall be necessary to constitute a quorum.

CHAPTER IV.

Art. 1. Lecturers, to deliver public courses, on any of the subjects of natural science, shall be appointed by the society. The lectures shall be given under regulations to be specially made by the society for each particular course.

Art. 2. Members shall be appointed by the president, from time to time, to give private lectures before the Academy in their hall of meeting.

Art. 3. When written communications are made to the Academy, they shall be referred to a committee, with directions to report thereon at the succeeding meeting.

Art. 4. Verbal communications and remarks from the members shall always be invited, and attended to, provided they be confined to the subjects for which the Academy was instituted.

CHAPTER V.

Art. 1. Every member elect, before his admission into the society, in full standing, shall pay to the treasurer, an initiation fee of ten dollars, unless he shall be already in the society as a correspondent.

Art. 2. Every member shall be subject to a quarterly contribution of three dollars, payable at the last stated meetings in March, June, September, and December.

Art. 3. Any member who shall pay into the hands of the treasurer the sum of fifty dollars, shall receive from him a receipt in full for all future quarterly contributions, and be thenceforward exempt from these payments.

Art. 4. In cases in which the society confer the honour of membership, as a mark of distinction, upon any person eminent for his acquirements in natural science, such person may be exempted, by resolution, from all pecuniary obligations.

Art. 5. The curators shall be exonerated from the payment of their quarterly contributions.

Art. 6. No pecuniary contributions shall be required of the correspondents.

Art. 7. No member shall be entitled to vote, at the annual elections, unless he exhibit to the tellers a receipt from the treasurer for all arrearages due to the society.

Art. 8. No money shall be paid by the treasurer, unless where a bill has been regularly presented, examined, and accepted by the auditors.

Art. 9. The treasurer shall keep a regular account of his receipts, and expenditures, which shall always be ready for the inspection and examination of the auditors, who shall report the state of the funds to the Academy when required.

CHAPTER VI.

Art. 1. The order of business, at the ordinary meetings of the society, shall be as follows:

First, Minutes of the last ordinary meetings.

Second, Donations.

Third, Written communications.

Fourth, Lectures.

Fifth, Verbal communications.

Sixth, Any other business, if called up by resolution of the Academy.

Seventh, The rough minutes read.

Eighth, Adjournment.

Art. 2. The order, at the meetings of business, shall be as follows:

First, The minutes of the last meeting of business.

Second, Reports of committees.

Third, Deferred business.

Fourth, New business.

Fifth, Elections.

Sixth, The rough minutes.

Seventh, Adjournment.

CHAPTER VII.

Art. 1. In such points of order, as are not noticed in this constitution, the society is bound by the established customs of other similar institutions.

Art. 2. No alteration shall be made in this constitution unless it be proposed, on the minutes, one month, and be sanctioned by two thirds of the meeting, at least twelve members being present.

CATALOGUE
OF
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OF THE
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MAY, 1818.

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Descriptions of several New Species of North American Fishes. By C. A. Le Sueur. Read March 3, 1818.

THE FIRST ORDER OF FISHES, OR CHONDROPTERIGIOUS. CUVIER.

Branchiæ fixed.

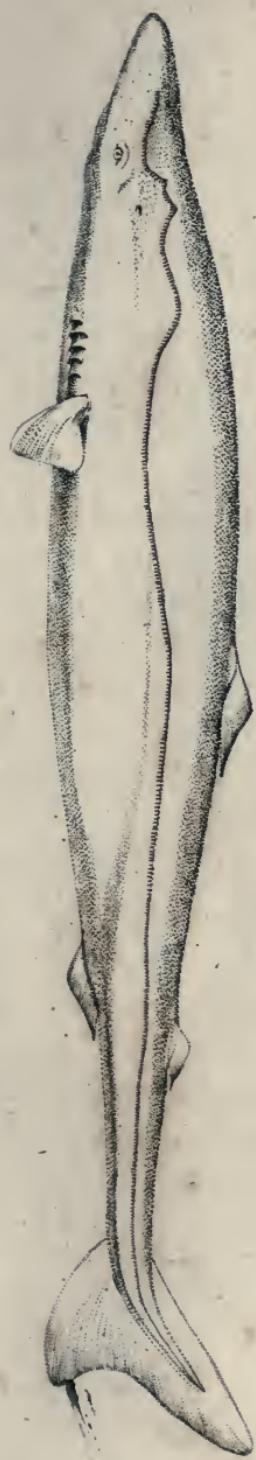
Second family, or the *Selaciens*—PLAGIOSTOMES. Dürméril.

Near Marblehead, in Massachusetts, the fishermen take a kind of shark which they call Nurse or Sleeper, doubtless from its inactive or sluggish habits. It is considered as rare on their coast. From a skin recently prepared by them, I have been enabled to make the following observations.

This individual, I think, belongs to a new subgenus, allied to the genus *Aiguillats* (*Spinax*, Cuv.) which I shall call *SOMNIOSUS*, or the Sleepers. Like *Spinax* they have spiracles, no anal fins, five small branchial apertures, approximating, and near the pectorals, but they differ in having a short obtuse snout. Pectoral, ventral and dorsal fins very small; dorsals without spines, caudal as in *Aiguillats*.

SOMNIOSUS brevipinna. *Lateral line* black, undulating at the head, and marked in its whole length with small transverse lines; *tail* wide, emarginate; the *first dorsal* midway between the pectoral and anal fins, the second a little further than the ventral, and both very near the tail.

C. A. Léonard del. & sc. inv.



SQUALUS BREVIFINNA



Body elongated, with a slight elevation, and narrow at the tail; *spiracles* distant from the eyes, and more elevated; *eyes* small, round, and situated laterally; the *pectoral* fins, which were larger than the others, except the caudal, were four inches at the base, and at most five inches in length. This individual, from the end of the snout to that of the tail, was six feet five inches long; and we may regard it as a shark with very small fins, whence its motion must be slow, and confined to the bottom, there sluggishly seeking its prey.

Skin rough, beset with triangular, curved, striated and pointed asperities.

Colour of the entire body a pale lead gray, somewhat darker on the back.

SQUALUS, or SHARK.

Spiracles none. With *anal fins*.

SQUALUS obscurus. Dusky Shark.

Plate IX.

Tail with a carina undulated above, and slightly emarginated at the base; *pectorals* long, narrow, and fal-ciform; *dorsals* and *anals* projecting backwards in a point; second *dorsal* opposite to the anal, the latter bilobed. A white spot on each side of the neck.

Head flat and broad; *snout* sharp-edged, rounded and wide at the end; *eyes* lateral, large, orbicular, pupil transverse, narrow, with a nictitant membrane originating below; *branchial* apertures five, unequal, the first very large, the last very small, and situate above the origin of the pectoral fins; *nostrils* oblique, and partially covered by a short, pointed appendage on the margin, near the end of

the snout; *tail* rounded, strong, with a falciform fin, terminating in a distinct, triangular, lanceolate lobe; lower lobe of the fin short and rounded; *ventrals* small sub-quadrangular, without posterior process; *teeth* triangular, serrate.

REFERENCE TO THE PLATE.

Fig. 2. the tail viewed from above. Fig. 3. one of the lower teeth; *a.* the denticulations magnified. Fig. 4. one of the upper teeth. Fig. 5. an eye, with its nictitant membrane.

SQUALUS littoralis. Ash-coloured Shark.

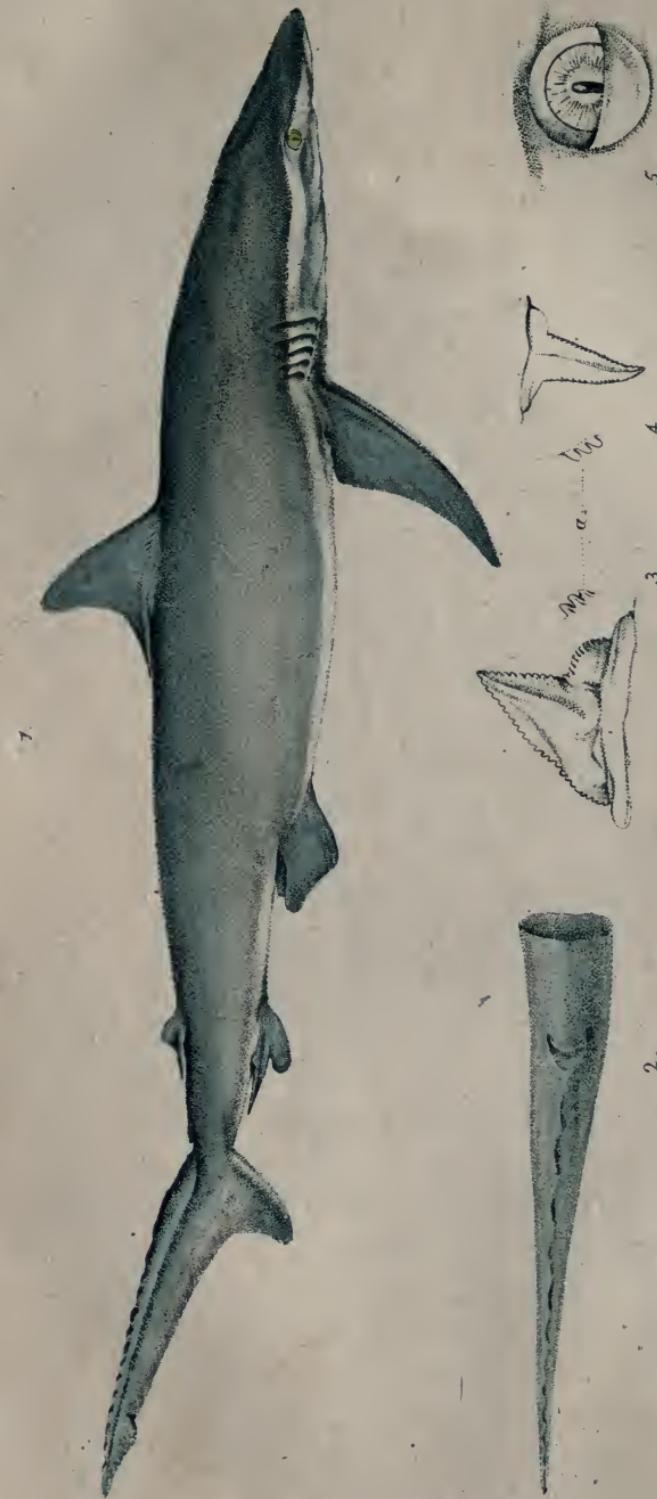
Tail with an undulated carina, slightly notched at the base upwards; *pectoral*, *ventral*, *dorsal* and *anal* fins large, not prolonged backwards, the second dorsal more forward than the anal; *snout* acute; *teeth* narrow, pointed and undulated.

Body short, thick, wider towards the abdomen; *head* flat, dilated between the eyes, and terminating in a pointed snout, rounded at the end; *nostril lobes* very short, apertures pretty wide, and laterally placed at the extremity of the snout; *eyes* very small, orbicular, brilliant, iris silvery: these are somewhat above the sides of the snout; *branchial* apertures five, very large, especially the first, the last much smaller, embracing the base of the pectoral fin; *dorsal* sub-quadrangular; the *pectorals* are soft; *tail* rounded, tapering to a point, and furnished with a falciform fin, terminated by a distinct triangular lobe. The opening of the jaws resembles the letter U; *teeth* long, and in three or four rows, without dentelures.

Colour a reddish ash gray; abdomen white.

Newyork market. Length three feet.

I owe the knowledge of this species to Dr. Mitchell of Newyork.

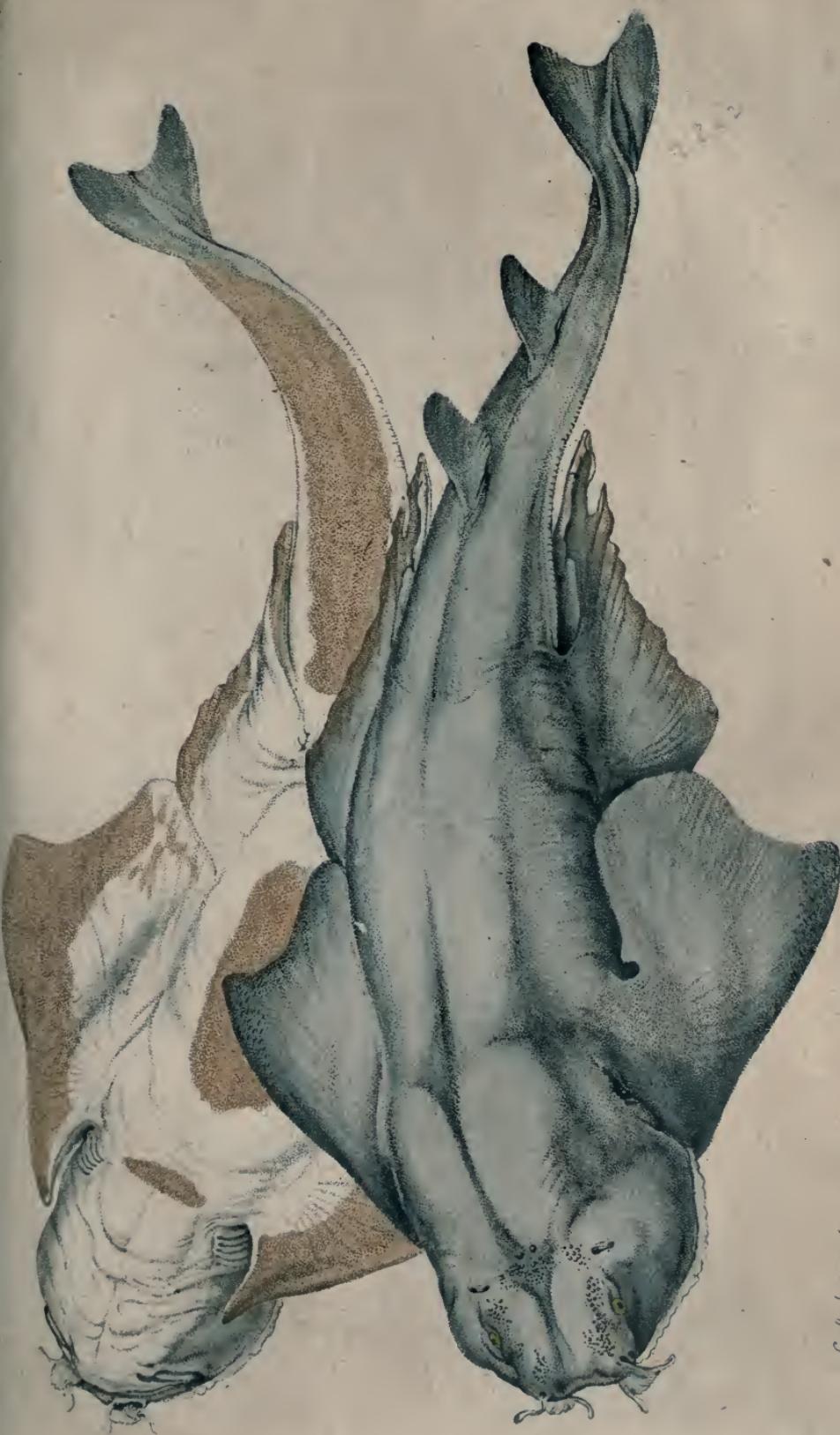


DUSKY - SHARK

C. H. Smith, Det. nat. imp.

DUMÉRIL -- SHARK

C. A. J. L. D. *intra* imp.



SQUATINA. (*Angels*, Dumeril.)

Gen. char. *Spiracles.* No anal fin. Mouth cloven at the end of the snout; *eyes* on the dorsal face, not lateral. *Head* round; *pectorals*, large, inclining forward, and only separated from the neck by a chink, which contains the branchial apertures; the two dorsal behind the ventral fins, and the caudal placed equally above and below the column. Cuvier, *Règne Animal*.

SQUATINA Dumeril.

Plate X.

Head bordered on each side by a white membrane; *abdomen, throat, pectoral* and *anal* fins marked by large red spots; *nostrils* with a broad ciliated skin on each side, as in the Barbel.

Body flattened, broad, and elevated towards the *pectorals*; *tail* attenuated and sharp-edged; *head* wider than long, obtuse, emarginated in front between the nostrils, depressed above and between the eyes; *neck* rather tumid and distinct; *eyes* small, yellowish green, pupil black, spherical, orbit elevated and furnished with blunt tubercles—similar ones occur above the nostrils, between the spiracles; the *cheeks* are flat, furnished with small mucous pores, very distinct between the spiracles; *nostrils* on the anterior edge, above the jaws, and between the eyes, aperture vertical and covered by a broad membrane; *spiracles* behind the eyes, wide, transverse; *jaw* protracted, opening; *teeth* lanceolate, rather gibbose in front; these are in six or seven distinct rows, having each five teeth; *branchial* openings very near each other in front of the *pectorals*; *tongue* triangular, flat, not distinct, terminated by a small fleshy, rounded appendage; *pectorals*

subtriangular, lengthened to a point before, thick at base, flexible at their posterior margin, and distinguished from the body by a slight round notch: the outer margin has curved sharp points; *abdominal* fins lanceolate, straight, narrow, bordering the body, and ending in an appendage, called by Bloch hands, in the males: a notch distinguishes the appendage from the fin. The two *dorsals* subtriangular, between the ventral fins and end of the tail; *caudal* elevated, notched, lobes pointed, the lower one longest.

Colour of the head, back, fins and tail a bluish ash gray, with reddish tints upon the head and margin of the fins; *abdomen* white; but there is a remarkable reddish spot on the throat, another on the abdomen, and another behind the vent, extending to the end of the tail. The pectorals and ventrals are in like manner bordered with large and irregular bands of the same colour.

My observations on this species are derived from three individuals, perfectly alike; and the drawing was made from one which Mr. Titian Peale kindly put into my hands for examination, before preparing it for the museum. Another was presented to the Academy of Natural Sciences by Mr. Lownes, a member; and the third exists in a private collection. The general length is from three to four feet.

This fish wholly differs from the European species, of which I made a drawing, from a fresh specimen, in 1813, at Rouen; it was also a male.

I have dedicated this fine species to M. Dumeril, in testimony of my remembrance and esteem.

SECOND ORDER OF FISHES, STURIONIENS, OR CHONDROPTERIGIENS.

With free *Branchiæ*.

These have gills much cloven, an operculum, but no rays to the membrane.

The second genus of this order, with free branchiæ*, contains but one species, the *Polyodon feuill*, *Squalus spathula*, of Lacépède, tom. i. p. 403. pl. xii. fig. 3. which was from the Mississippi. An individual from the river Ohio, was presented, by Mr. Hazard, to the Academy, and this, in the form of its body, fins and snout, is closely allied to the foliated Polyodon, but differs in the total absence of teeth. A circumstance so remarkable authorizes us to consider the present individual a new species, and perhaps the type of a new subgenus near Polyodon. Both species, however, so much alike in body, fins and snout, might well be united under the name *Spatularia*, Schn. if we reject the teeth from those characters attached to the genus by Cuvier and Lacépède. In other respects they resemble each other. The two then would be specifically distinguished, one with teeth, the other without teeth. Or, should the adoption of a new genus be preferred, I would propose the following characters.

Genus PLATIROSTRA.

Gen. char. *Jaw, tongue and throat* destitute of teeth. *Snout* flattened, elongated and spathuliform. *Fins* and *body* closely resembling those of the Sturgeon, but without plates. The tail only is covered on each side by small bony plates, as in that genus.

* Cuvier, Regne Animal.

PLATIROSTRA edentula. *Snout* not so long as one third of the body, dilated and rounded at the end.

Body nearly round, pointed at the tail; *skin* rather smooth than rough, covered with small irregular osselets, which are more abundant on the head. The *head* and *snout* covered with long osseous plates, which are radiated, and interlocked at their extremities: these are in pairs, two on the head, and about six other pairs along the snout. Between the extremities are other smaller plates so as to fill the vacancy. The orbiculars are strong, forming the base of the snout, and extend to about half its length. Both its sides are occupied with small stelliform discs, the rays of which cross each other and present the appearance of an osseous reticulation, supporting the membranous skin of the snout.

Eyes small, oblong, above the articulation of the upper jaw; *nostrils* small, double, one above the other, in front of the eyes, but a little more elevated.

Jaws equal, without teeth, maxillary and intermaxillary close together, and in length equal. Inferior mandibles simple and narrow; opening of the mouth large; *spiracles*, as in sturgeons, behind the eyes, and in front of the articulation of the analogue of the *præoperculum*. At the other extremity is an opercular plate, radiating backwards, and below this, the analogue of the *sub-operculum* and *interoperculum*, which articulate with each other. A large skin supports all these bones, expanding and attenuating to a point posteriorly almost to the end of the pectoral fin, and covering the wide branchial aperture on each side.

Branchiæ large: the arcs have two rows of long rigid bristles, in close connexion, directed towards the front.

These rows defend a broad membranous expansion, that accompanies the interior contour of each arc, between the bristles, the base of the membranes being furnished with small and very compact cartilaginous laminæ, and behind the arcs is a branchiferous membrane, to support the pectinated structure, with free extremities. The shoulder bones are covered with trifid papillæ, which resemble a small insect.

Fins very like those of the sturgeon, rays bony, articulate and divided, the first usually strong, at the upper part of the tail they are very strong. The inferior rays have a long articulation.

Tail large, notched, with pointed lobes.

The *lateral line* commences on the head, branches towards the eyes, towards the sides in front of the præoperculum, across the neck, extends on each side of the back, beginning to decline a little in front of the dorsal fin, and terminates at the tail. In its whole length are to be seen minute ramifications, straight and curved more or less distant from each other.

Colour. This cannot be strictly given from a dried specimen, but on a comparison with several dried sturgeons, the present species seems to be of an olive red.

Length from the end of the snout to that of the tail three feet ten inches. Snout from its extremity to the eyes twelve inches long, and three inches wide.

P. 26.—D. 58.—V. 40 a 50.—A. 56.—C. $\frac{15}{84}$ sup.
infer.

The above description was made from two individuals taken in the Ohio, one in the cabinet of the Academy of Natural Sciences, presented by Mr. Samuel Hazard, a member, the other in Peale's museum, bearing this in-

scription: Paddle fish, caught in the river Ohio, and presented by Robert Patterson, esq. and with this article did the museum commence in June, 1784.

SECOND SERIES OF FISHES, OR OSSEOUS FISHES.

Cuvier, Règne Animal.

Fifth Order, MALACOPTERIGIENS. ABDOMINAL.

First Family, SALMONES.

Second Subgenus LES EPERLANS. (*Osmerus*,
Artedi.)

These have two rows of distinct teeth on each palate, the *vomer* containing only a few in front. In other respects their form is that of the trouts; but the gill membranes have only eight rays. Body without spots, and the ventral fins coincide with the anterior edge of the first dorsal. Caught at sea near the mouths of great rivers.
Cuvier, Règne Animal.

Osmerus viridescens. *Maxillaries* denticulated in their whole length, mandibles very wide, and doubly crenated lengthwise in the middle; *dorsal* fin higher than wide, its origin corresponding with that of the ventrals. *Head* and *back* of a fine golden green as far as the lateral line; *pectorals*, *abdominals* and the rest of the body silver-white. Air-bladder fusiform, swollen at the middle.

Body long, subcompressed, and subtransparent; *back* straight, a little elevated; *lateral line* faint, blending the green colour of the back with the white of the sides and

abdomen; *lower jaw* somewhat longer than the upper, recurved, opening, prolonged as far as the eyes; *teeth* strong, cylindric, long and crooked, three at the tongue very strong, one of which is at its extremity; *pectorals* large; *anal* wide in front, narrow back, slightly notched; *caudal* forked, with acute lobes; *adipose fin* a little bent, and terminating in a point; *eyes* large, orbicular, iris white and brown, pupil black; *scales* equal, rhomboidal.

Length about ten inches.

Taken with the line, from Boston to Newport. Good for food.

B. 8.—P. 14 a 16.—D. 11.—V. 9.—A. 15.—C. 19 $\frac{2}{3}$.

We believe this to be a new species, and have called it *viridescens*, from the green colour of its back.

Genus COREGONUS. OMBRES.

1. *COREGONUS Artedi.* *Body* subfusiform, a little elevated at the back; *head* small, having an osseous radiated plate, which is covered by the skin; *snout* pointed.

In form this species approaches the Scombres; a section of it is oval. *Head* small and narrow; *snout* short, terminated by small intermaxillaries; *maxillaries* wide, sharp-edged as in the herring, edges entire; *mandibles* carinate, producing inwardly a triangular pedunculate expansion, very small conical teeth inserted in the skin of the lips, at the extremity of the jaws: these teeth were sufficiently manifest in a small individual, but not visible in a larger one, a female, which came under my observation. Rays in the osseous plate of the head tubular, and open at the exterior, some tending backwards, and others towards the end of the snout. A faint carinated

line divides the top of the head in the dried specimen. *Lateral line* straight and near the middle; *nostrils* double, close to the end of the snout, and articulation of the maxillaries; *scales* round, approximated, easily falling off: the base of the tail is covered with them.

Colour ash blue at the back, paler and silvery on the rest of the body, with yellow tints on the tail, head and dorsal; *iris* whitish, pupil black.

B. 9.—P. 16.—D. 12.—V. 12.—A. 13.—C. $\frac{6}{6}$ rays.

Length ten to twelve inches. Very delicate food. Taken in Lake Erie, and at Lewistown, Upper Canada. Called Herring Salmon.

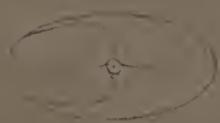
2. *COREGONUS albus*. *Body* less fusiform than the preceding; *back* elevated from the nape to the first dorsal fin.

This species differs from the preceding one in its body having more depth, its back a greater elevation, and its proportions much stronger in body, fins and scales. The adipose fin, which is broad, appears to consist of delicate rays, much pressed, and in pairs.

This species, which is white, is called at Lake Erie White fish. They are caught in June and salted.

Second Family, or that of the HERRINGS.

These are readily known by being destitute of an adipose fin. The upper jaw is formed like that of the Trouts, having in the middle intermaxillaries not pedicled, and maxillaries at the sides. *Body* always covered with scales. All possess a natatory bladder, and for the most part numerous cæcæ. Some ascend the rivers. Cuvier, *Règne Animal*.



THE HERRINGS. CLUPEA. L.

The Herrings have the maxillars bowed in front, longitudinally divisible into several parts. The opening of the mouth moderate, not wholly set with teeth, often indeed toothless. Dorsal fin above the ventrals. Many are taken in our seas, not easily distinguished from their resemblance in form and argentine colour. (Cuv. Règne Animal.)

Dr. Mitchell, in his memoir on Fishes, inserted in the Literary and Philos. Trans. of Newyork, has introduced to us thirteen species of the family of Clupea, among which we have not found those which have come under our observation, and of which we are about to give a concise description, considering them as new. Two of the species are of the genus Herring of Cuvier, and the three others of the genus Megalopes (La Cep.)

The first species, which I call *Clupea fasciata*, (Fasciated Herring), is known under the name of Alewife by the fishermen of Sandwich, and appears only in the spring; but about the end of August 1816, we still had a sight of several individuals, in length one, two, four, eight and nine inches, all alike, except as to size. *Body* compressed; *back* straight; *breast* and *abdomen* forming a bow downwards as far as the tail; seven to eight lines of a blackish blue at the sides of the back, and a rounded notch at the bottom of the divisions of the tail, of which the lower lobe is longest.

The entire length of the body is about six times that of the head, which is not quite equal to the depth of the body; *snout* short; jaws equal; maxillars of middling

width, scarcely reaching beyond the centre of the eye, which is near the end of the snout, and round, its iris yellow and pupil black. *Operculum* parallelogramiform, slightly oblique, and depressed at the lower edge; *dorsa* as high as the width of its base; *pectorals* acute, rather long; *ventrals* somewhat behind the front of the dorsal, which is large and truncated; *anal* long, subequal; *lateral* line scarcely visible; *colour* blue on the back, lighter at the sides, and of a silver white under the abdomen, breast and tail; yellow tints are reflected from the scales upon the opercula, base of the tail and fins. The blue lines are deeper towards the back than the abdomen, where they disappear.

These are salted as well as the other species, and like them are taken with the seine.

B. 7.—D. 18.—P. 16.—V. 9.—A. 18.—C. $22\frac{6}{6}$ rays.

2. *CLUPEA elongata*. *Body* lengthened, fusiform, compressed; *snout* long, lower jaw longest; two scaly appendages on each side of the base of the *caudal fin*, which is small and forked.

Its *body*, from the end of the snout to that of the tail, is five times longer than the head, by one in depth from the base of the dorsal; *back* slightly arcuated; *tail* narrow; *abdomen* carinated, the spines of which are hardly perceptible: those between the ventral and anal fins are more manifest, and are in number from fourteen to fifteen; opening of the *mouth* pretty large, maxillars narrow, extending somewhat beyond the centre of the eye, which is round, having a nictitant membrane, like the other species; *teeth* in the jaw, palate and tongue; *dorsal fin* less in height than length, sub-quadrangular; *pectorals* short, roun-

ded at the extremity; *anal* subequal, narrow, somewhat elongated; *lateral* line obsolete; *back* and *head* of a deep blue, with yellowish tints; sides and abdomen of pale blue; *pectoral*, *ventral*, *anal* and *caudal* fins slightly blended with a reddish green; *opercula* varied with yellow, red and violet; *iris* reddish, *pupil* black.

Scales of a middle size, readily falling off.

B. 7.—D. 19.—P. 18.—V. 9.—A. 18.—C. $22\frac{5}{7}$ rays.

We observed this in October, 1816, on the coast of Marblehead and Sandy Bay, under the name of English Herring, which the fishermen have given to it, doubtless from a resemblance it bears to the Pilchard, from which it differs in having a straight dorsal fin, without emargination, as in the Pilchard. Taken with the seine, and cured for home consumption.

(To be continued)

An Account of the Crustacea of the United States. By
Thomas Say. Read November 11, 1817.

(Continued.)

[Since these papers were read to the Academy, we have found, in the southern states, several interesting and apparently new crustaceous animals, descriptions of some of which will now be added, and those of the remaining ones will form a supplementary addition to this essay; this notice is only given to account for the anachronisms that may appear.]

Genus PENÆUS.

Three anterior pairs of feet didactyle, the anterior pair shortest; *interior antennæ* inserted above the line of the exterior ones, which have a large scale attached to the peduncle; *tail* with the middle process elongate-triangular, broader at base.

SPECIES.

1. *P. fluviatilis*. *Rostrum* serrated above with about nine teeth, beneath with about two; *tail* and *terminal joints* of the *abdomen* carinated; *tail* with middle process canaliculate above.

Astacus fluviatilis Americanus. *Seba, tom. iii. tab.*
17. fig. 2.

Inhabits North America.

Rostrum as long as the scales of the antennæ, grooved each side, armed above with from seven to nine teeth, of which the posterior one is distant from the others, and two, three, rarely four teeth beneath, which, when but two, are distant and placed nearer the tip; a short spine at the base of each interior antennæ, terminating an oblique short carina, which is margined above by a groove that is bifurcated before its posterior termination, with an acute, short spine in the angle; an abbreviated longitudinal line and groove, sometimes obsolete, originates behind the exterior antennæ, forming with the preceding groove the letter N; *eyes* large; *exterior antennæ* double the length of the body, scales longer than the second joint of the interior antennæ, with a deeply impressed submarginal line; *abdomen* with the fourth and fifth segments carinated; sixth segment with the carina more elevated, mucronate behind, a lateral line of longitudinal abbreviated lines on the fifth and sixth segments; *tail* with the middle process deeply canaliculate and mucronate; *feet* with the first and second joints of the anterior pair, and second joint of the second pair armed with a spine beneath; fingers with short fascicles of spines. Length about eight inches.

Rarely brought to the Philadelphia market. Seba's figure is without doubt intended for this species, though

all the feet are represented as didactyle; this, however, was, it would appear, an error in the drawing.

The name of *fluviatilis*, applied by this author to our *Penæus*, is certainly not so appropriate as many others which might be substituted, more especially as it is not an inhabitant of fresh waters, as its name seems to indicate, but is always found in salt or brackish water. Nevertheless, as the name has been given, it would be presumption of the most reprehensible kind in me to reject it, particularly as the species is actually found within the mouths of rivers, probably as high up as the salt water extends.

The sexes are distinguishable from each other by the absence or presence of a connecting membrane to the anterior pair of natatory feet; the membrane is formed by the dilatation and junction of the inner appendages of these parts.

They appear in great numbers in the estuaries of the southern states and Florida early in the spring, when they are caught, to supply the markets, by means of a cast net; the fisherman ascertains their presence in the water at night, by the lines of light which are formed by their darting amongst the phosphorescent molluscae, when a splashing of the water, or the advance of a boat, alarms them.

When recent, the colour is usually whitish, tinged with reddish, and each side, particularly of the abdominal segments, with very pale greenish yellow, and sprinkled in every part, except the eyes, tips of the caudal lamellæ, pectus and venter, with small, radiate, reddish-brown spots; eyes greenish, with dark moveable pupil; caudal lamellæ tipped with verdigrise green, cilia red; antennæ reddish, the dorsal carina of the fourth, fifth and

sixth abdominal segments, and the rostrum, are brown above.

Genus CALLIANASSA.

Four anterior feet didactyle; *anterior pair* largest, very unequal; *second pair* much smaller; *third pair* submono-dactyle; *fourth and fifth pairs* spurious, obsoletely didactyle; *antennæ* inserted in nearly the same horizontal line, *intermediate* ones with double seta and elongated peduncle of which the terminal joint is much longest, *exterior* ones without lamellæ; *exterior caudal lamella* simple.

C. **major*. *Thorax* one fourth the length of the body, somewhat membranous, with an oval coriaceous plate above, which before forms a rostrum of a very small projecting acute angle; *eyes* very small, placed on the upper side of their peduncles, which are cylindrical, approximate at base, incumbent on and as long as the first very short joint of the interior antennæ, obtuse, and originating under the anterior margin of the thoracic plate; *exterior antennæ* longer than the thorax, two terminal joints of the peduncle equal, *seta* more than thrice the length of the peduncle; *interiores* more than twice the length of the others, more robust, deeply ciliated beneath; *external pedipalpi* with the second joint much largest, compressed, oval, third joint not so large as the fourth, which is semi-oval, terminal joint or nail closing on the edge of the preceding joint; *feet*, with the exception of the two last ones, compressed; *anterior larger foot* placed indifferently on the right or left, and is the only part that is of a compact crustaceous consistence, third joint sublinear, granulated, compressed within, convex on the exterior side,

raised into an angle on the middle of the lower edge and incurved at base; *carpus* trilateral, granulated, not concave, at base beneath projected into a prominent angle or hook, which on the hind edge is furnished with a few short stout hairs, superior edge simply emarginate near the base; *hand* very much elongated, sublinear, compressed, glabrous, two-jointed, first joint a little contracted towards the base, not broader than half the length of the carpus, second joint equal in breadth to, and, excepting the fingers, two thirds the length of the preceding joint; *fingers* more than half as long as the preceding joint, with fasciculated hairs, thumb rectilinear at base, decurved at tip and armed with a strong, truncated tooth behind the middle, finger unarmed, incurved; *second pair* of feet with the third joint obtriangular, equal at tip to the base of the fourth, which, with the thumb and finger, is triangular, terminal joints deeply ciliated; *third pair* with the penultimate joint transverse, attached to the preceding one by the middle of the base, deeply ciliated and terminated at the superior tip by a very small joint, which is rounded at base and acute at tip; *fourth and fifth pairs* somewhat cylindrical, terminal joints comose, thumb and projecting angle or finger concealed by the hair; *abdomen* of six segments, two anterior ones membranaceous, the first narrowed to the base, supported on each side, and at the tip beneath, by a semicrustaceous rib, with a linear appendage at each of the hind angles beneath, the second segment supported on each side by a vitreous scale, and at base beneath by an angular semicrustaceous rib, with linear appendices as in the preceding segment; third, fourth and fifth segments semicrustaceous, octangular, subequal; sixth segment subquadrate, narrowed behind

and contracted each side in the middle; *natatory appendices* attached to the third, fourth and fifth segments, composed each of a semilunate plate, with an incurved fin attached to the anterior lateral base, which when at rest is placed on the anterior face of the plate, and the plate when at rest is incumbent forwards; *tail* rounded at tip, contracted towards the base, and about two thirds the length of the preceding segment; *lateral lamellæ* simple, longer than the tail, inner one linear, comose, exterior one dilated, triangular, ciliated at tip.

Inhabits the coasts of the southern states and of East Florida.

Cabinet of the Academy.

Length of the specimen four and a half inches.

The exuviae of this singular animal, particularly of the large anterior foot, occurs very frequently on the sea beach of the southern states early in the spring. It is rarely seen, owing to its recluse mode of life. We found this specimen by digging in the sand of the bay shore of the river St. John in East Florida, about eighteen inches below the surface, near low-water mark; it had formed a tubular domicil, which penetrated the sand in a perpendicular direction to a considerable depth, the sides were of a more compact consistence than the surrounding sand, projecting above the surface about half an inch or more, resembling a small chimney, and rather suddenly contracted at top into a small orifice. The deserted tubes of the Callianassa are in many places very numerous, particularly where the sand is indurated by iron into the incipient state of sand-stone; they are always filled up, but may readily be distinguished by the

indurated parieties and summit often projecting a little above the general surface.

A curious parasite abounds on the body of this species, perfectly distinct from the genus *Ione* of Mr. Latreille; a description of it will be given in its proper order.

Genus GEBIA.

External caudal lamellæ simple; *tail* quadrate; *antennæ* placed on the same horizontal line, *interior* ones short, with two setæ and elongated peduncles, of which the third joint is much longest, *exterior* ones destitute of the accessory lamina at base; *feet* ten, two anterior ones monodactyle with a projecting angle for a finger.

SPECIES.

G. * *affinis.* *Thorax* glabrous, transversely grooved in the middle by an arcuated line, behind which, on each side, is a minute spine, anterior part of the thorax covered with numerous fascicles of short, rigid hairs, arising from short tubercles, or impressed interrupted lines somewhat arranged in longitudinal rows, broad before and divided into a short canaliculated rostrum, and a prominent tooth each side, which is rather shorter, and separated from it by a groove, which is longer than that of the rostrum, and like it glabrous, rostrum and teeth hairy to their tips, the latter with a short spine beneath; *eyes* smaller than their peduncles, which are hairy above, concealed; *anterior* feet largest, ciliated with long hair beneath (excepting the carpus) on the inner edge; second joint with a spine beneath, third joint with four or five beneath and one above near the tip; *carpus* subtriangular, with three very small ones above, five or six at tip larger, and the

largest acute one at the inferior inner tip, an impressed longitudinal line on the outer side; *hand* not broader than the carpus, linear, nearly equal to the third joint, with three elevated ciliated lines above, two impressed ciliated ones on the outer side, beneath with long hair, and a groove, which is a little oblique, and marks the origin of the short angle or finger at tip, a short spine above at base, finger as long as the carpus, with three or four lines of rigid hairs, grooved on the outer side and glabrous within; *second pair of feet* ciliated with long hair beneath, third joint with a prominent acute spine at base beneath, and another somewhat dilated and compressed at tip above, nail deeply ciliated above; *third pair* hairy on the terminal joints, third joint about three-spined beneath and a little hairy; *fourth and fifth pairs* hairy on the terminal joints, nails very small and concealed by the comose termination of the feet, those of the former closing on the tip of the preceding joint, those of the latter upon a projecting angle of the preceding joint; *abdomen* glabrous, segments each with a lateral, longitudinal, impressed, submarginal line, the first, second, sixth and fifth subequal, the latter shorter, third and fourth equal shortest; *natatory feet* composed of a suborbicular peduncle, supporting two deeply ciliated lamellæ, of which the outer one is more than as long again as the inner one, suboval, attenuated at base and acute at tip, inner one oval, narrowed at base; *caudal lamellæ* short, ciliated at tip, deltoid, subequal, the inner one smaller, truncate at tip, a longitudinal elevated line in the middle, and a costal outer margin which is slightly angulated near the base, outer one somewhat rounded at tip and at the inner angle, two

raised lines near the middle, which are recurved at tip, and an outer costal margin; *tail* subquadrate, with an impressed longitudinal line, entire at tip.

Inhabits Georgia.

Cabinet of the Academy.

Length two inches and a quarter.

Found on an oyster bed near the edge of the water at low tide, and appears to be rare. Its analogue of Great Britain, upon which this genus was founded by Dr. Leach, discovered by Mr. Montague, and by him described in the Transactions of the Linnean Society of London, is also very rare, and inhabits the subterraneous passages of the Solens or Razor shells; our species is very similar to that, but differs from it more especially in having the extremity of the tail entire.

Genus ALPHEUS of Fabricius.

Feet, two anterior pairs didactyle; *carpus* of the second pair divided into several joints.

SPECIES.

1. A. * *heterochælis*. *Hands* of the anterior feet very unequal, larger one deformed and having a very small transverse carpus; *rostrum* simple, spiniform, acute.

Inhabits coasts of the southern states.

Cabinet of the Academy, and Museum of South Carolina.

Thorax glabrous, unarmed; *rostrum* carinate in the middle and terminating in an acute point which nearly attains the tip of the first joint of the inner peduncle; covering of the eyes convex, prominent, rounded at tip; *superior antennæ*, a small scale terminating in an acute

spine and placed at the outer base of the peduncle; *pedipalpi* deeply ciliated, attaining the tip of the peduncles of the antennæ, first joint bicanaliculate beneath, third joint spinose beneath, spine movable, tip acute, a little hairy; *inferior antennæ* nearly as long as the body; *anterior feet*, hands very unequal, the larger one appearing deformed, nearly as large as the thorax, compressed, excluding the fingers, semioval, abruptly constricted near the fingers on each edge; *fingers* very robust, thumb cultrate, near the base, within a prominent lobe, or tooth, which is received into a corresponding fossula of the base of the finger, surface a little hairy, hairs assembled at tip into a double row, finger concave within for the reception of the thumb, obliquely emarginate above on the inner edge near the tip, and extending into an angle near the middle of the inner edge; *carpus* minute, transverse, carinated, shorter than the thumb; *second pair of feet* smallest, but not shorter than the hind ones; *three posterior pairs*, penultimate joint armed beneath with moveable spines and a few hairs, nails horny, glabrous, acute; *tail* at tip rounded, narrower than at base, deeply ciliated, above behind the middle four, small, conic, moveable spines, placed in cavities; *external lateral lamella* biparted, two small spines at the outer tip of the first segment, and two larger at the tip of the peduncle, tips deeply ciliated; *colour*, when recent, green, sprinkled with numerous, small, brownish spots, a large dark green spot at tip of the caudal lamellæ; hand beneath white, fingers tipped with white.

Length nearly one inch and a half.

The larger hand of this animal attracts attention by its unusual size and deformed appearance; the individual

of the museum of South Carolina was found by Mr. L'Hermenier on the coast of that state. The specimen in the collection of the Academy we found on the coast of Amelia Island, Florida, concealed under a considerable mass of *Ascidia*; when placed in water, the thicker filament of the superior antennæ was supported in an erect posture, vibratory, and appeared deeply ciliated near the tip.

I have placed this in the genus *Alpheus* of Fabricius and Latreille, as the characters will not agree with those ascribed to that genus by Dr. Leach, such as "exterior caudal lamella simple; third segment of the abdomen gibbous above," &c. the antennæ also are relatively situate as in *Astacus*, and the scale at the base of the outer antenna is not proportionably larger than in that genus.

2. A. **minus*. *Hands* of the anterior feet very unequal, larger one inflated, oblong-oval, equal; *carpus* very small; *rostrum* spiniform, and a lateral spine before the eye.

Inhabits coasts of the southern states, and of East Florida.

Cabinet of the Academy.

Thorax glabrous, *rostrum* and *convex lid of the eye* forming three subequal spines before, of which the rostrum is somewhat longer and more acute, the lateral spines conic-acute; *exterior antennæ* shorter than the body, scales at base acute, spiniform; *larger hand* oblong-oval, not compressed, colour white, tip red, banded near the base of the fingers with white in the female, and white tipped with green in the male, *nails* short; *external pedipalpi* obtuse at tip and crowned with spines.

Length, male four fifths of an inch, female one inch.

It is very possible that this may be the young of the preceding, notwithstanding its diverse characters, but we are at present disposed to consider it as distinct. The above description is drawn from seven specimens of different ages, all agreeing perfectly in these traits. They occurred in recent Spongia, &c. cast ashore by the waves.

Genus CRANGON.

Anterior feet largest, monodactyle, and furnished with a spurious finger; second and third pairs very slender, simple; fourth and fifth more robust; *antennæ* inserted in nearly the same horizontal line, exterior ones with a large scale at base, interior ones of two setæ; *exterior caudal lamellæ* simple.

SPECIES.

C. * *septemspinosis*. *Rostrum* not so long as the eyes, with a spine behind it on the thorax, and another on each side; *anterior feet* armed with a spine on the third joint beneath.

Inhabits bay shores and inlets of the sea. Common.

Thorax seven-spined, one of which is placed on the back before the middle, a lateral one on each side in a line with the dorsal one, another at the external canthus of the eye, and a more prominent one at the anterior angles, situated adjoining a shorter one with which the basal joint of the scale of the exterior antennæ is armed; two impressed lines arising, one from an oblique fissure in the superior margin of the orbit of the eye, and the other at a fissure in the external canthus, are confluent

above the lateral thoracic spine, and disappear behind the middle of the thorax on each side, a third line originates from the fissure in the external canthus, passes beneath the lateral spine and forms, with the two preceding lines, the letter N; *rostrum* shorter than the eyes, obtuse, margin elevated; *eyes* little prominent; first joint of the peduncle of the interior antennæ, concave above for the repose of the eyes, furnished on the external side with a submucronate small scale, resembling an elongated continuation of the inferior margin of the orbit of the eye, and armed beneath with an obtuse spine which is visible on dissection; *exterior antennæ* as long as the body, annulate with blackish-brown, scales nearly as long as the interior antennæ; spine of the anterior feet situate near the middle of the third joint beneath; *finger* spiniform, prominent, inflected; middle process of the tail simple, conic; colour, when recent, pale cinereous, with very numerous, irregular, stellate, blackish-brown spots.

Length of the body, from the tip of the rostrum to that of the tail, one inch and two fifths nearly.

An active little animal; when at rest at the bottom of the water it is not readily discoverable, owing to its being somewhat translucent and of a pale colour. This species, and those of the genus *Palæmon*, &c. are indiscriminately called *Shrimps* in this country. There is no doubt but our *Crangon septemspinosa* strongly resembles the *C. vulgaris* of Europe, which is the true shrimp; I have, in fact, considered it heretofore as the same, but it appears to differ in the number of spines.—It is found as far south as East Florida.

Genus PALÆMON.

Exterior antennæ inserted below the line of the interior ones, and furnished with a large scale at base; *interior antennæ* with three setæ; *exterior lamellæ* of the tail undivided; *ultimate joint* of the *external palpi* shorter than the preceding; *four anterior feet* didactyle, first pair smaller.

SPECIES.

1. P. * *vulgaris*. *Rostrum* acute, with eight or nine teeth above, and three or four beneath; *fingers* of the larger pair of feet shorter than the palm of the hand.

Inhabits bays and estuaries. Very common.

Rostrum as long as the scales of the antennæ, ciliated between the teeth; *thorax* armed with two spines on each side, which are equal, and placed one at the base of the interior antennæ, and the other at the base of the exterior ones; an impressed line passes between these spines, and terminates about the middle of the side, an obsolete, oblique, abbreviated one originates at the superior margin of the orbit of the eye; peduncle of the scale armed with a spine at the exterior tip; first joint of the peduncle of the interior antennæ concave above, and furnished with a spine near the external base, and another near the external tip; *carpus* of the first pair of feet rather longer than the preceding joint, armed with a spine on the inner tip, hand elongate-oval, unarmed, about one half as long as the carpus, fingers equal; carpus of the second pair, nearly equal to the preceding joint, unarmed, shorter than the palm of the hand, hand elongated, fingers uncinate at tip, shorter than the hand, linear, equal, with two or three small, obtuse teeth at the base, middle process of the ap-

pendages of the tail, with two moveable, prostrate, conic spines placed each side in cavities; tip truncated and furnished with four moveable spines, of which the interior ones are much more elongated, and separated by an immoveable shorter one in the middle; interior *antennæ* about half as long as the exterior ones, the short seta ciliate with long, parallel, equidistant hairs; colour whitish, almost pellucid, with a few dark points, eyes dark, peduncles spotted with yellow.

Length from the end of the rostrum to the tip of the tail, one inch and two fifths.

This species is one of those which pass under the name of *Shrimp*, but they all differ specifically, as this does generically, from the true shrimp of Europe. It is congeneric with the European *Prawn*, and in point of form resembles it much, but that arrives to the length of five inches. Found as far south as East Florida.

2. P. **tenuicornis*. *Rostrum* with about eleven or twelve teeth above, and six or seven beneath; fingers of the larger feet rather longer than the palm of the hand.

Inhabits the Banks of Newfoundland.

Rostrum as long as the plates of the antennæ, densely ciliated between the teeth; spines of the thorax, and of the peduncles of the antennæ, placed as in the preceding species; *carpus* of the first pair of feet unarmed, and hardly longer than the hand, fingers linear, a little reflected, as long as the palm; *carpus* of the second pair as long or rather longer than the palm of the hand, fingers a little longer than the palm and reflected; antennæ very slender, white, interior ones more than two thirds of the length of the exterior ones.

Length one inch and one fifth.

Considerably resembles the preceding, but differs from it in the number of teeth in the rostrum, in the more attenuated antennæ, and greater length of the inner ones; the wrists, hands and fingers also are proportionally different, the fingers are a little curved upwards, but in the preceding they are in a right line with the hand. Described from a specimen in my cabinet; and another in the collection of the Academy, presented by captain Hamilton.

ORDER STOMAPODA. *Latr.*

Head distinct from the thorax, and divided into two parts, of which the anterior one supports the antennæ and the eyes; *eyes* pedunculated; *branchia* abdominal, placed behind each pair of natatory feet.

Genus SQUILLA.

Thorax exhibiting several joints; *interior antennæ* with three, articulated setæ; *exterior antennæ* simple, furnished with a scale; *abdomen* six-jointed; *tail* flabelli-form.

SPECIES.

S. * *Empusa*. *Abdomen* with eight, *four last joints* of the *thorax* with four, raised longitudinal lines; *four last joints* of the *thorax* not bifid over the coxæ of the feet; large plate of the thorax angulated over the coxæ of the arms.

Inhabits the coast of Rhodeisland.

Cabinet of the Academy.

Thoracic plate with an obvious lateral angle before the rounded termination; second segment shortest, two-

spined on each side at the edge, of which one is placed above the other; third and fourth segments entire over the insertion of the coxæ of the feet, mucronate; fifth segment somewhat rounded over the insertion of the posterior feet, where it is partially concealed by a small squamiform appendage, which is attached by a suture to the first joint of the abdomen; *thumb* armed on the inside with five, long, permanent spines, and terminated in a similar, but more elongated one, all received at tip in corresponding cavities of the anterior edge of the hand; *hand* elongated, thickened, pectinated on the anterior outer edge, parallel with the recipient cavities, three moveable spines near the base, inflected, so as to meet the terminal spines of the thumb; third or principal joint, unarmed; carinated line behind the anus very short.

Length of the female four and a half inches, male two and three quarter inches.

This fine species was found by Mr. Le Sueur on the coast of Rhodeisland, and was presented by him to the Academy. The very striking resemblance which it bears to the *S. mantis* has hitherto caused it to be confounded by naturalists with that species. But an attentive examination of its characters, and a comparison of them with those of the species just mentioned, will convince us that it is perfectly distinct. I will, in this place, briefly mention two or three differences, which of themselves are sufficient to justify a separation of the American species. The large plate of the thorax, in the foreign specimen of *S. mantis* under examination, is perfectly simple over the coxæ of the large feet or arms, whereas in our species, that part is extended into an angle; the next segment is, it is true, two-spined on each side in the European animal, but

those spines are placed horizontally, and not, as in our species, vertically, with respect to each other; the two following segments, also, are deeply emarginate over the insertion of the feet, but, in the species here described, they are simply mucronate in that part, the anterior lobe, which would form the notch, being wanting.

The specific name is taken from Empusa in Entomology, a genus of insects, which was separated by Mr. Illiger, from the Linnæan genus mantis, to which it has as much affinity, as the Squillæ here compared have for each other.

The *S. empusa* inhabits the coast as far south as East Florida, it varies a little in colour. I here add a description of the colours, &c. of a recent male specimen; *feet* white, *anterior ones*, second and third basal joints tinged with rosaceous and edged with yellow at their tips; *interior antenæ*, peduncles blackish, joints yellow at base, seta white annulate with black; *exterior ones*, peduncles dusky, seta white, scale yellow or greenish on the terminal half, and indistinctly spotted with minute brownish-black spots; *segments of the body* margined behind with darker green and edged with yellow; *tail* tinged with rosaceous, and varied with blackish and yellowish; *lamellæ*, inner ones black, paler at base, outer ones, first joint black, base and spines white, second joint yellow, inner margin black; *peduncle of the lamella* elongated, terminating in two white spines, of which the inner one is rather longer than the inner lamella, slightly toothed on the middle of its length, from whence a double groove proceeds to the tip, a spine over the insertion of the first joint of the external lamella which has also a spine under the insertion of the accessory plate; eyes cylindric, rounded at tips,

emerald-green, brilliant, placed obliquely on their peduncles.

The male may be readily distinguished from the other sex, by its smaller size, and by the presence of a small fistulous body, attached near the base of each of the hind feet beneath.

(To be continued.)

Observations on two species of the genus GRACULA of Latham. By George Ord. Read May 19, 1818.

Those Grakles, denominated by nomenclators *Quiscalala*, and *Barita*, having been confounded, I shall attempt, by fresh descriptions, and a brief history of them, to place them in a point of view which shall prevent uncertainty in future.

GRACULA quiscala.

LINN. GMEL. i, p. 397—7.—*Purple Grackle*, LATH. Gen. Syn. i, p. 462—6.—*Monedula purpurea*, the purple Jackdaw, CATESBY'S CAR. VOL. i, p. 12, T. 12.—*Purple Jackdaw of the sea coast*, BARTRAM, TRAVELS, p. 290.—*Jackdaw*, ARCT. ZOOL. i, p. 308.—153.—*Sturnus barita*, DAUDIN, TRAITE' D'ORNITHOLOGIE, TOME ii, p. 320.

Black, with reflections of pansy-purple on the head and neck; interscapular region rich lustrous steel-blue; tail rounded; the roof of the upper mandible furnished with a slight osseous carina; length sixteen and a half, breadth twenty-two and a half inches.

Bill from the angle of the mouth an inch and three quarters in length, black, as are also the legs, feet and claws; the upper mandible projects considerably over

the under; *irides* pale straw colour; *tongue* cartilaginous and bifid; *tail* of a deep black colour, slightly glossed with green, composed of twelve feathers, and measures from its insertion eight inches in length; *rump*, *thighs* and *vent* plain black; *shoulders* of wings with a steel-blue gloss; *back*, *lower parts*, and *lesser-coverts* with a greenish gloss.

Female. Length twelve and a half, breadth seventeen and a half, inches; *bill* to angle of mouth an inch and a half long; *head* and *neck* above umber-brown; *back*, *wings* and *tail* liver-brown; *breast* and *lower parts* pale yellowish brown, darkest on the breast; *flanks* pale umber; in some specimens the abdomen was of a dirty wood-brown; *back*, *scapulars*, and *lesser wing-coverts* with faint greenish reflections; over the eyes a yellowish streak; the other parts as in the male. In one specimen the iris was brown, its outer edge pale yellow. The upper tertials, in both sexes, when closely examined, are found to have a waved appearance.

GRACULA barita.

LINN. GMEL. i, p. 396—4.—*Boat-tailed Grackle*, LATH. Gen. Syn. i, p. 460—5.—PENN. Arct. Zool. i, p. 309—154.—*Sturnus quis-cala*, DAUDIN, tome ii, p. 316.—*Gracula purpurea*, the lesser Purple Jackdaw, or Crow Blackbird, BARTRAM, p. 291.—*Gracula quis-cala*, WILSON's American Ornithology, vol. iii, p. 44, pl. 21, fig. 4.

Black, with resplendent reflections; the roof of the upper mandible furnished with a large osseous carina, two eighths of an inch long; *tail* cuneiform; *length* thir-

teen inches and three quarters, *breadth* seventeen and three quarters.

Bill from the angle of the mouth an inch and a half long, black, as are the *legs*, *feet* and *claws*; the upper mandible projects over the under; *irides* pale straw colour; *tongue* cartilaginous and jagged; *head* and *neck*, in some specimens, of a lustrous steel-blue and golden-green, in others of a glossy auricula-purple, mixed with pansy-purple, and tinged with copper colour; *interscapular region*, in some, of a golden-green and steel-blue, in others of an auricula-purple and golden-green; *rump* rich coppery, mixed with auricula-purple; *lower parts* auricula-purple and copper; *scapulars*, *lesser wing-coverts*, and coverts of *secondaries* and *tertials* of vivid colours, in which the auricula-purple predominates; *secondaries* and *tertials*, in some, with purple reflections on their exterior webs, in others glossed with steel-blue; *tail* composed of twelve feathers, their outer webs glossed with steel-blue and auricula-purple, five inches and a half in length, concave when folded, when the bird is on wing greatly boat-shaped. The colours of this species are so various, in different individuals, that no single description can indicate the whole of them.

Female. Length eleven inches and a quarter; *head* and *neck* with reflections of steel-blue and green, but not so vivid as in the male; whole *plumage* of a bistre-brown, the upper parts with slight reflections of green and auricula-purple, the reflections of the wing-coverts more vivid; inner webs of the tail feathers blackish brown; *tail*, when the bird is flying, but slightly concave; the other parts as in the male.

OBSERVATIONS.

The Purple Jackdaw or Grakle inhabits the Carolinas, Georgia and Florida, where it is known by the name of Jackdaw. My friend, Mr. William Bartram, informed me that it sometimes visits Newjersey. If it inhabits this state it must be rare, for although I have explored the coast of Newjersey many times, yet I have never had the good fortune to find it there. Georgia and East Florida appear to be the favourite places of residence of this species. It associates in common with the Boat-tail; and is very numerous among the sea-islands, and the adjacent marshes of the continent, where it may be observed feeding, at low water, on the oyster-beds, and sand-flats. It has a general resemblance to the Barita, but it is much larger, and its tail is but slightly concave when expanded. In its voice it also differs, its *chuck* being shriller, and it utters other notes not unlike the sound produced by a watchman's rattle. These birds construct their nests, in company, on bushes and reeds, in the vicinity of ponds and marshes. Their eggs I have not seen.

It is singular that no good specimen of this species should have been examined by the naturalists of Europe; and, in consequence of its history being but imperfectly understood, it is constantly confounded with the Barita. Latham says that it is eleven inches and three quarters long, and he makes the length of the Barita to be nearly thirteen inches. These admeasurements were evidently made from one species, the last mentioned. Daudin represents the Barita, meaning the Quiscal, as thirteen inches in length. The Quiscal of this author is the true Barita: he makes its length to be eleven inches. I have

little doubt that the Mexican Crow of Latham, Brisson's *Grande Pie du Mexique*, is this species.

The first specimens which we examined of the Jack-daw were procured at Ossabaw island, on the 22d January. At this period we saw but a few males, scattered over the cotton plantations. We afterwards found them more numerous as we advanced to the south. Near the entrance of the river St. Juan, in East Florida, in the early part of February, the males were common, but we saw no females. In a few days, however, small groups of the latter appeared, associating by themselves, on the borders of fresh water ponds. From these circumstances it is probable the species is partially migratory, and that the females which we saw had lately arrived. Their gentleness, indeed, seemed to favour the supposition, as they suffered one to approach within a few feet of them without betraying alarm. It is a well-ascertained fact that the males of almost all our migratory land birds precede the females. This is manifestly the case with the *Sylviae* and *Muscicapæ*. About the middle of March both sexes of the Jackdaw were associated in flocks.

It may excite surprise that the acute author of the American Ornithology should have mistaken the Grackle figured and described in his third volume as the Quiscalala. But our surprise will abate on referring to the works of the naturalists of Europe, who had noticed both species, all of whom represented the Quiscalala as common in Pennsylvania. If Wilson had ever examined a specimen of the Jackdaw, he would have perceived at once his mistake. When he printed the catalogue of Land Birds, appended to the sixth volume of his Ornithology, he indicated the Boat-tail as a species to be

described and figured in a future volume; but afterward he adopted the opinion, arising solely from the vague descriptions of naturalists, that the Quiscal and Barita constituted but one species.

It seems necessary to note an error in Wilson's description: he represents the tail of his species as *rounded*, whereas it is *cuneiform*, as is evident from his excellent figure. This conformation of tail affords a good specific character, on a comparative examination of the two species in question.

The Boat-tailed Grackle, called by the inhabitants of the middle states Crow Blackbird, makes its appearance in Pennsylvania in March. It is of essential service to farmers in ridding their fields of the multitudes of larvæ of insects which the vernal season brings forth. Besides its attachment to insects and worms, it is fond of maize or Indian corn, which it plucks up as soon as the blade appears at the surface of the earth. In autumn the Grakles assemble in large flocks, sometimes associated with the Red-winged Starlings, *Oriolus phœniceus*, Linn. and attack the maize while in its milky state, occasioning great damage to the farmers, some of whom, in the state of Delaware, where these birds assemble in immense multitudes, lose the half of their crops by their depredations. To tell one, groaning under such a calamity, that these species are beneficial to agriculture in general, would afford him but little consolation; and yet, without the services of these birds, it is a question whether Indian corn would repay cultivation or not. After the maize is gathered the Grakles move off to the Carolinas, Georgia and Florida, where they winter.

The Boat-tail commonly builds its nest in an apple-

orchard; sometimes on a pine tree, if situated near cultivated places. It lays five eggs, which are hatched the latter part of April. Four or five pairs of this species constructed their nests, the present season, in a pine tree at Bartram's botanic garden, on the Schuylkill, occasioning no small uneasiness to the venerable botanist, who apprehended the expulsion of those residents which annually breed in his garden; it being the practice of the Crow Blackbirds to destroy the eggs and young of those small birds which dwell in their vicinity. The Grakles in their turn suffer from the depredations of the Common Crow and Hawks; and to guard against their attacks is one reason why they choose to build near farm houses. Along the coast they resort to a singular mode of protection. The Fish Hawk,* *Falco piscator*, Briss. *F. Carolinensis*, Gmel. builds a nest composed of a mass of sticks, sometimes upwards of three feet high; in the interstices of these sticks the Grakles construct their nests; and I have seen as many as five attached to one of the Fish Hawk. The whole thus established appear to dwell in amity; each watches over the property of the other; and from a coalition of interests and strength they find security. It is a highly interesting spectacle to behold the generous Fish Hawk, surrounded by his chattering retainers, all of whom appear to testify by their actions their gratitude for his protection.

What species Linnæus described from when he made

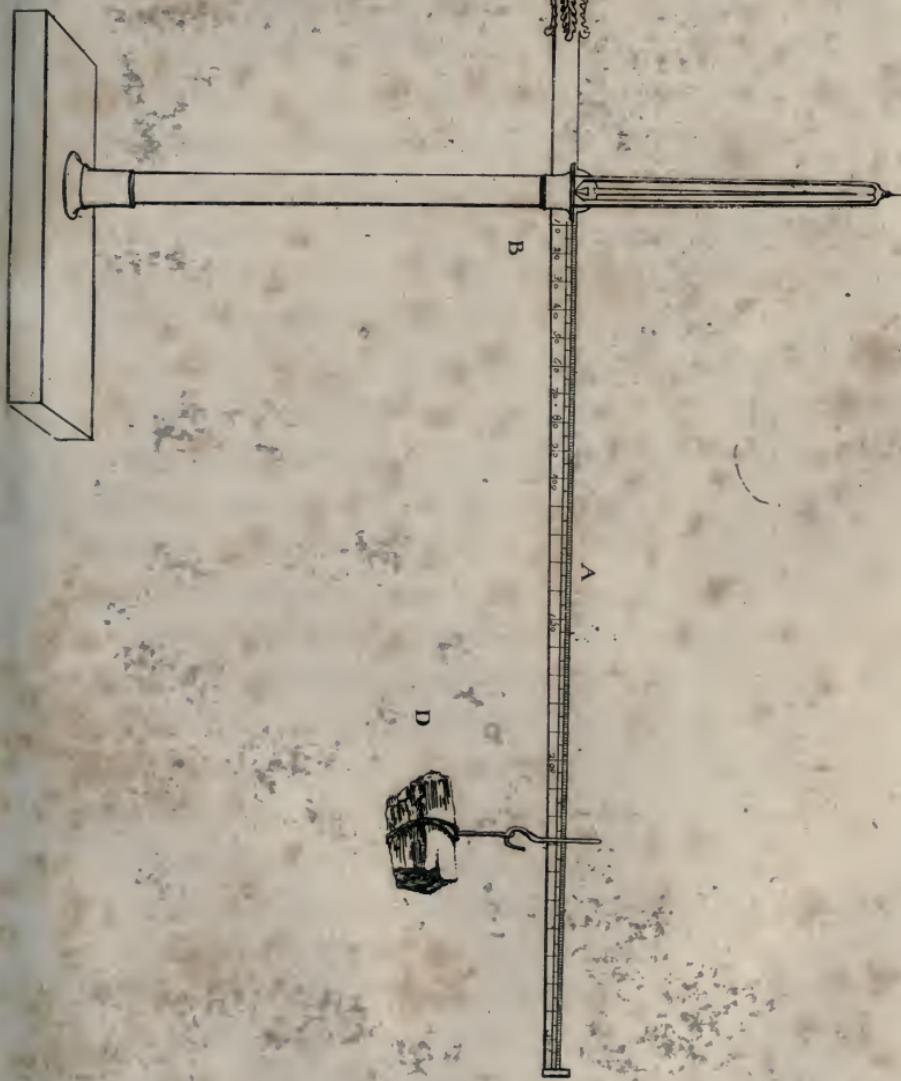
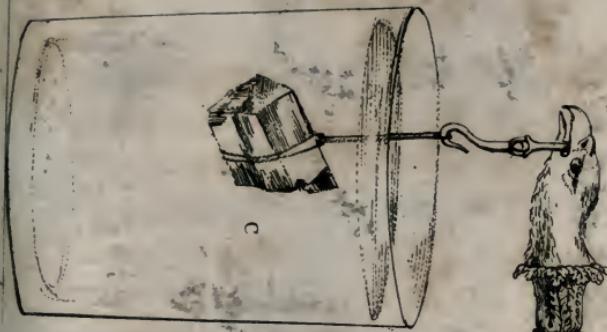
* Wilson, after Latham and some others, considered the American Fish Hawk or Osprey, as the *Falco haliaetus*, or Bald Buzzard. Monsieur Vieillot was of a different opinion when he published an account of it in his *Hist. Nat. des Oiseaux de l'amerique septentrionale*; but subsequently, in the *Nouveau dictionnaire d'Histoire Naturelle*, he coincides with the belief that they are the same. I shall take another opportunity to prove them specifically distinct.

out his characters of the *Barita* I am at a loss to conjecture, for it should seem not to have been the Boat-tail; his words are: *subgrisea, humeris cæruleis, remigibus extus viridibus.* Syst. Nat. Gmel.

Report of a Committee on a NEW HYDROSTATIC BALANCE, invented by Isaiah Lukens, and submitted to the Academy. Read May 26th, 1818.

The undersigned committee beg leave to report, that the instrument invented by Mr. Lukens, and referred to them by the Academy, consists of a very sensible steelyard or Roman balance, so arranged as to be particularly adapted to the finding of specific gravities. The arms of the balance are so constructed, in the first instance, as to be in exact equipoise, when unloaded. The object [C] of which the specific gravity is to be ascertained is suspended to the shorter arm, by any of the usual methods; and its relative weights in air and in water are indicated by the numbers on the graduated arm [A] at which the moveable weight or pea [D] is suspended, when the beam is brought into a horizontal position. It is evident that the absolute weight of the pea is arbitrary, and it is one of the advantages of the instrument that the pea may be altered to suit the weight of the object under trial; even a stone of a proper size might be employed, and would always be at hand.

When great accuracy is desired, a second pea is employed, which must be either one tenth, or one hundredth part the weight of the first. The larger pea will then indicate the units of weight, and the smaller the tenths or hundredths. The same object might also be obtained by suspending the pea to the middle of a Vernier-scale.





The instrument, and its necessary appendages, are arranged in a small box, so as to be very convenient, and very portable.

Your committee after a due consideration, and an actual trial of this apparatus, are of opinion, that, for facility and rapidity of operation, it has the advantage over every other that has hitherto been proposed for the same purpose; and they therefore cheerfully recommend it to the attention of the Academy.

They propose that it should be named *Lukens's Hydrostatic Balance*.

All which is respectfully submitted.

William Maclure,

R. M. Patterson,

Isaac Lea.

*Essay on the FORMATION OF ROCKS, or an Inquiry into
the probable Origin of their present Form and Struc-
ture. By William Maclure.*

Our knowledge of the actual and present state of the substances which constitute our globe, is unfortunately confined to a small portion of the surface; from which it would appear, that we are still very deficient even as to those facts which are within the reach of our observation and experience, and which may perhaps be necessary to the forming of any rational conjecture concerning the formation or former state of those substances which cover the external surface of the globe.

Concerning the nature and properties of the great mass which constitutes the interior of the earth, we are

entirely ignorant; few of our mines penetrate deeper than one fifty thousandth part of the earth's diameter under the surface, and none of them go beyond one twenty-five thousandth part of that diameter: it would appear, therefore, that any mere supposition concerning the actual and present state, or the nature of those substances which form the interior of the earth, is unsupported as yet by any reasonable analogy; and that all conjectures concerning former changes, partial or total, in the nature and structure of those substances, are removed still farther from any thing analogous in our present state of knowledge.

The earth being flattened at the poles, does not necessarily imply its former fluidity; we may be permitted to doubt the analogy between our experiments on bodies moving in our atmosphere, and the earth's motion in space: our total ignorance of the nature of the fluid which occupies what is usually called space, tends to render the analogy inconclusive.

May not the mode of casting patent shot be considered as an experiment on the form which liquid bodies would take by a rotatory motion? A drop of melted lead let fall from the height of two hundred feet is completely globular, and not flattened at the poles; the lead might be thrown with force from the top of the tower, which would imitate the centrifugal force, as gravitation does the centripetal force, and make the experiment more analogous.

The supposition that the earth was in a fluid state when it took its present form, leads to the supposition that it was always so; and that fluidity was the original state of the earth, kept so by all the general laws and order of nature, all of which general order and laws of na-

ture must be totally changed before the earth would take a solid form.

On the supposition that the earth, previous to its fluid state, had existed always in a solid state, and that some creation or accident produced the fire or water necessary to its liquefaction, we have in that case first to suppose, that the order and nature of the general laws which had kept it always in a solid state, were totally changed, to produce a fluid state; and that another change in the general laws which produced and kept it in a fluid state, must have taken place previous to its having become again solid.

It may be doubted, whether the uniformity, order and regularity of the general laws of nature, which have at any time come within the limits of our observation, can warrant a supposition, founded on such complete changes in the mode of action.

The neptunists admit the fluidity of the earth, and endeavour to prove that water must have been the cause of that fluidity; though to *dissolve* the greater part of the substances now found on the surface, or as far under it as we have yet penetrated, would require two or three thousand times more water than the solid contents of the whole globe. How nature has disposed of that immense quantity of water, now become unnecessary by the consolidation of the globe, is but one of the many difficulties which arise out of the neptunian system.

The volcanists, likewise, consider the fluidity of the globe as a necessary foundation for their system; but insist that fire must have been the cause of it, nor can they, in a satisfactory manner, dispose of the immense quantity of heat or caloric, become unnecessary by the consolidation of the globe: difficulties that must always attend suppositions

of a total change in the general laws of nature, because the agents necessary to the retaining of matter in one state, must be disposed of before that matter can acquire a different form or nature.

It is, perhaps, an historical fact, that all geologists who have formed their systems on the examination of the northern parts of the continent of Europe, where there are no existing volcanoes, are neptunists; and those who have examined Italy, or other volcanic countries, previous to the formation of their systems, are more or less volcanists, which tends to prove, that opinions are the result of our knowledge, and our knowledge the consequence of the different situations which chance or choice has thrown us into: we ought, therefore, not to be astonished, much less irritated, at the difference of opinions, but consider them as the natural effect or consequence of our locality or opportunities.

Suppose the earth was a body of moderate size, that we could cut up and dissect as we do animals, vegetables, or other objects of natural history, it is probable that the first part which would attract our attention would be the volcanoes, in action, with the mountains formed by the ejected matter; we should probably first examine the nature of this ejected matter, to ascertain what proportion of the surface of the globe, or ball, was covered with similar matter: we should, of course, find out the extinct volcanoes, and though the fire had ceased to act, the similarity and relative position of the matter would induce us to conclude that they were produced in the same manner, as well as the small detached remains of similar substances, which we would find scattered over the whole surface.

After shaving off all that we supposed to be formed by fire, the next active agent that would attract our attention would be water. The productions and changes wrought by the operation of this agent, would be examined: the aggregates of rounded particles, deposition with organic matter, &c. would be considered as belonging to formations by water.

Clearing the surface of the ball with our dissecting chisel of all that we could ascertain by analogy to belong to the formation by water, or fire, we would come to a species of matter that did not exactly resemble either of the above formations, which, on examining, we would find of various textures; and comparing it with the portions already cut off, we would find part of this matter which had a distinct resemblance to that formed by fire, and part to that formed by water, but so mixed and confused together as to prevent our forming any distinct conclusions. After turning the ball two or three times, we would naturally wish to know what constituted the interior or central part; for which purpose we would cut it in two, and expose the interior to our examination and analysis, as we had before examined the exterior; and if we should find that the interior was fluid, and like a soft boiled egg, and only the exterior was solid, we might follow the analogy of the egg a little farther, and deduce the probability, that at some former period the exterior crust had been fluid, and had since become solid, by some operation of nature analogous to something we had ourselves observed.

On the contrary, should the examination of the interior of the ball, prove, that it consisted of a variety of solid substances, farther and farther removed from any resemblance with those we had observed as formed on the

surface by fire or water, we should probably conclude, that these agents were not necessarily instrumental in the formation of those substances; and that we were totally ignorant of the process which nature may have adopted to form those substances, and we should doubt whether those substances had not always existed in that state. Thus would the investigation be left, until farther dissections, and the analyses of similar constituted balls, had thrown more light on the subject of our inquiries.

In this manner the examination of the origin of the rocks that form the external crust of our globe ought, perhaps, to be conducted; beginning with those substances that have been formed under the immediate evidence of our senses, and completely within the limits of our observation, either by water or fire, and proceeding to others having a direct resemblance, in structure, component parts, or relative situation, or united by the chain of positive analogy, to the same mode of formation; evidently deriving their origin from the action of the same agents of water or fire, until we come to the last crust, beyond which we cannot penetrate; then we must drop the thread of positive analogy, and not being able to make a cut to the centre of the globe, be content with probable conjecture.

At this point, where positive analogy finishes, and probable conjecture begins, will be the natural line which will divide the rocks into *two classes*; the first class will contain all those whose origin, either by fire or water, has taken place under the evidence of our actual observation, or those that can be traced by positive analogy to the same origin. The *second class* comprising all those rocks which have no positive analogy with either, yet contain-

ing some parts which have a distant relation to both the modes of formation.

As nature does not advance by large leaps, but by small and regular steps, leaving no marks in the chain of gradation on which we can place the limits of our artificial division, the line of demarkation between the first and second classes will be doubtful; and the rocks approximating on both sides, will not be well determined. The line also must change with the progress of our knowledge and discoveries, and rocks placed in the second class now, because we have not found analogous rocks in the first class, may change their place by new discoveries, and pass from the second to the first class, or from what may be called the unknown into the known, whenever future experience and observation have thrown light on their origin.

There is no question here concerning the relative period in which the different formations by water or fire have originated. This is difficult to ascertain; and from the numberless derangements in the original order, liable to many exceptions, nor is the necessity of it evident in the inquiry concerning the origin. Nothing within our observation proves the priority of one mode of formation over the other, nor militates against the probability of one formation often alternating with another, and it is more than probable that the reason we have so few instances of such an alternation on record is because there is so small a proportion of the crust of our globe accurately examined.

In attempting to separate the rocks, whose origin comes within the sphere of our positive knowledge, or positive analogy, from those whose faint and distant re-

semblance leaves the nature of their origin to conjecture, I am convinced, that neither my experience, knowledge, nor industry, are adequate to the task of comparing their various differences and resemblances, so as to form an adequate conclusion; but the faults and imperfections in the execution will not, perhaps, injure the propriety of the arrangement or method; for it has always appeared to me necessary to fix some boundary between the knowledge of facts which must increase with our experience, and the field of conjecture which may, perhaps, on the contrary, diminish as our positive knowledge augments.

It is probable that nature has many more ways of effecting the changes, in the form of rocks, than we are acquainted with; and that she employs many agents, the nature and properties of which we are as yet totally ignorant of; nor is it improbable that she may form the same rock by two or more different agents. When we pretend to limit the operations of nature, to suit our contracted ideas, we most probably do her injustice. To proceed from the known, which we see daily forming, towards the unknown, through a chain of reasoning strictly analogous, is perhaps all that our present knowledge will permit us to do.

It is not intended to give a description of all the particular rocks that may constitute a formation, or be subordinate to it, many of them, such as the Topaz-rock, (which has only as yet been found in a bed, in clay slate, forty or fifty feet broad, and from two hundred to three hundred feet long) would tend to confuse: a general description of the formation, with a few observations, is all that I shall attempt.

SYNOPSIS OF THE ORIGIN OF ROCKS.

As we do not comprehend either the creation, or annihilation, of matter, by the origin of rocks we mean the last change which produced their present form, and the agents that nature employed to give them that form, or effectuate that change.

FIRST CLASS. Of Neptunian origin.

First Order. Formed by nature under our observation, visible, and resting on the evidence of our senses:

Sand beds,	Brown Coal,
Gravel beds,	Bog Iron ore,
Sea-Salt,	Calcareous Tuffa,
Sandstone,	Calcareous depositions,
Puddingstone,	Silex from Hot-springs, &c.

Second Order, resembling, in structure, position, or component parts, the first order, the evidence of their origin resting on direct and positive analogy:

Coal,	Graywacke & Graywacke slate,
Gypsum,	Transition Sandstone,
Chalk,	Transition Limestone,
Compact Limestone,	Transition Gypsum,
Sandstone,	Transition Clay Slate,
Puddingstone,	Anthracite,
Rock-Salt,	Siliceous Shist.
Old Red Sandstone,	

SECOND CLASS. Volcanic origin.

First Order. Thrown out of active volcanoes, and resting on the evidence of our senses:

Compact Lava,	Mud Lava,
Porous Lava,	Obsidian or Volcanic Glass,
Porphyritic Lava,	Pumice Stone,
Scoria,	Cinders, &c.

Second Order. Resembling the first order in structure, position, and component parts, having the remains of craters, with currents of lava diverging from them: though the fire, which may have formed them, is now extinct; the evidence of their origin resting on direct and positive analogy:

Basalt,	Pearlstone,
Trap formation, called by Werner the newest Flœts	Porphyry attending the Trap as above,
Trap formation,	Clinkstone ditto, &c.
Pitchstone,	

Third Order. Where the rocks resemble the second in texture and component parts, but where all the craters, cinders, scoriæ, and most of the porous rocks, have been washed away, leaving only the solid parts, such as

Basalt,	Pitchstone,
Trap, called by Werner the newest Flœts	Porphyry,
Trap formation,	Clinkstone, &c.

These rocks resemble the volcanic in relative position, covering indifferently all the other classes of rocks, and in detached pieces, without any extensive continuity or stratification, but divided by vertical fissures, the proof of their origin resting on a more distant analogy than order second.

THIRD CLASS. The origin doubtful, resembling a little the second order of the first and second classes, but the analogy neither direct nor positive, amounting only to probable conjecture.

First Order. Such rocks as probable conjecture would incline to place in the Neptunian origin:

Gneiss	Clay Slate,
Mica Slate,	Primitive Limestone.

Second Order. Such rocks as probable conjecture would incline to place in the volcanic origin:

Hornblende,	Sienite,
Porphyry,	Granite,
Greenstone,	

The origin of rocks may first be divided into the known and the unknown. The two first classes contain the known, and the third class the unknown. Farther observations may change their situation, and place a rock, which is now in the unknown class, in the known class, by which means the unknown class will diminish as our positive knowledge increases, and in proportion as the known class augments.

The first class, or those rocks whose origin comes within the limits of our positive knowledge, or can be traced by positive analogy, divides itself into the Neptunian and Volcanic, according as water or fire were instrumental in their formations.

First Order. The Neptunian or aqueous formation.

1. *Sand beds*, consisting of small particles of rocks rounded by friction or attrition.
2. *Gravel beds*, consisting of large particles of rocks, rounded by friction or attrition.
3. *Clay beds*, sediments by water, including Marle, and all sediments in impalpable powder.
4. *Sea-Salt*, with all its attendants of Argile, Gypsum, &c.
5. *Sandstone*, particles of sand rounded by friction, and cemented by calcareous or other infiltration into a hard adhesive rock.
6. *Puddingstone*, particles of gravel rounded by attrition, and cemented by the infiltrations of siliceous, calcareous, ferruginous, and other aqueous depositions, &c.
7. *Braunkohle Turf*, or other bituminous or vegetable substances included in the beds of the above alluvial rocks.
8. *Bog Iron Ore*, Pyrites, &c. included in the above alluvial.
9. *Calcareous Tuffa*, a coarse-grained deposition from a chemical dissolution in warm springs, &c. &c. from a rapid and sudden precipitation.
10. *Calcareous deposition*, called Travertina at Rome, from a slower precipitation, by evaporation of water, permitting it to take a compact and solid form.
11. *Silex* from siliceous precipitations: slowly as in petrified wood and other organic matter, which are solid and compact, or suddenly as from the hot springs of Iceland, where it is cellular and rather coarse-grained.

The above-mentioned rocks are stratified horizontally, following the inequality of the surface on which they rest;

they are found either on or near the surface of the earth, and their origin is within the limit of our observation: as nature may be said to carry on her manufactory, subject to the daily inspection of our senses. They have been called alluvial rocks, by some mineralogists.

Second Order of Neptunian rocks.

12. *Coal* formation, including the attendant strata of Puddingstone, Sandstone, Slaty Clay, Bituminous and Alluminous Strata, &c. with vegetables, and other impressions of organic matter.
13. *Gypsum*, coarse grained, composed of shells, and other organic matter, with all its attendant strata of indurated Marle, Sandstone, cellular, and other depositions of silex, &c. &c.
14. *Limestone*, coarse grained, composed of shells and other organic matter, with all its attendant strata of indurated marl, sandstone, cellular and other depositions of silex, &c.
15. *Chalk*, including all the attendant substances, as siliceous depositions of flints in strata and nodules, pyrites, &c. with shells and other organic matter disseminated, &c.
16. *Compact Limestone*, including every species of horizontally stratified limestone, with the remains of organic matter, as shells, &c. &c. disseminated.
17. *Sandstone*, including all horizontally stratified sandstone, having organic matter, or alternating with strata including organic matter.
18. *Puddingstone*, including every species of rock formed of rolled masses horizontally stratified, having organic matter, or alternating with rocks including organic matter.

19. *Rock-Salt*, including all the attendants of Clay-beds, Gypsum, Sandstone, &c.
20. *Gypsum*, horizontally stratified, including Clay, Sulphur, Crystals of Quartz or Aragonites, &c. &c. in which no remains of organic matter may yet have been found.
21. *Sandstone*, with an ochry, ferruginous cement, called by Werner, Rothe tote Liegend, with all its accompanying stratifications of limestone, thin strata of Coal, Gypsum, &c. &c. having organic matter disseminated, though rare.

The above rocks are generally stratified horizontally, or following the dip or inclination of those on which they rest, but lying deep under the surface, and their period of formation, prior to the date of our observations, prevents their mode of aggregation from coming within the observation of our senses; and must depend on rational or positive analogy.

22. *Graywacke*, rolled masses of rocks cemented by a clay slate, more or less apparent, or by a slaty fibrous cement, having some resemblance to a Chlorite Slate: the last mentioned generally found near the primitive.
23. *Graywacke Slate*, small rounded particles of rocks, enveloped in a slaty base, accompanied and alternating with Calcareous Shist, &c. &c.
24. *Sandstone* of transition, fine grained, having generally a siliceous cement: in the fresh fracture, resembling quartz, but in a state of decomposition the granular texture appears.
25. *Limestone* of transition, generally a small crystalline grain, with small veins and seams of calc spar, hav-

ing small plates of clay slate often disseminated, &c.
&c.

26. *Gypsum* of transition, having a small granular crystallization, accompanied with small plates of slate or shist.
27. *Micaceous Slate* of transition, alternating with small grained crystalline limestone: the strata consisting of a species of talcy or mica slate, and a variety of shistoze, intermediate rocks, as on the Ardennes, and the Appenines, including roofing slate, and its attendants.
28. *Anthracite* including the attendant strata of clay slate, alum slate, black chalk, &c. &c.
29. *Siliceous shist*, as Kiezel-sheiffer, Jasper, and other siliceous stratifications.

The above rocks are generally stratified, dipping or inclining from the horizon, at an angle of from 30 to 50 degrees, and in some cases even more; most of them, except perhaps the last, (No. 29,) have been found to contain the remains of organic matter, though in small quantities; and are a little further removed from the 1st order, though still united by the chain of probable analogy to the same formation. No. 29 approaches nearer the Green stones and Porphyries, where the analogy is not so conclusive.

Greenstone, including greenstone porphyries, and the hard, compact rocks on the borders of the 2d class.

Porphyries, crystals of quartz, feldspar, &c. in compact, and often small crystalline bases; found near to the limits of the 1st and 2d class, and partaking of the properties of both.

As the above rocks approach those of the 2d class, they gradually remove from any positive analogy to the

Neptunian of the 1st class. They contain no remains of organic matter, nor many particles of rocks rounded by attrition; nor do they resemble any of the precipitations or depositions contained in the first order of the Neptunian rocks. They are allied to the Neptunian division, by their stratification and relative position; touching and perhaps alternating, with some rocks of the 2d order of the Neptunian division; in structure and external appearance, they resemble many of the members of the volcanic family, and approach in many of their properties to that species or formation of Rocks, called by Werner, the Trap or Basalt formation, (newest flötz trap formation). The few remarks we have to make on this order, may therefore come most properly after we have examined all the rocks united either to the Neptunian or volcanic origin, by positive or rational analogy. This will clear the field; and bring those of doubtful and conjectural origin, into a smaller compass, where their resemblance or difference can be better examined; and the result of the comparison may throw light on the 3d class of Rocks, where positive or rational analogy is deficient.

(To be continued.)

Account of two new genera, and several new species, of fresh water and land shells. By Thomas Say. Read May 25, 1818.

*Genus *POLYGYRA.*

Shell discoidal, more or less carinated on the upper edge of the whorls, umbilicated; aperture longer than broad; lips thickened, toothed, or folded and continued,

folds concave beneath; *pillar lip* raised above the preceding whorl, and concave beneath.

Animal granulated; *tentacula* four; *eyes* at tip of the superior tentacula and retractile; *operculum* none.

SPECIES.

1. P. **auriculata*. *Shell* beneath convex; *whorls* five, a little rounded, crossed by numerous raised, equidistant lines forming grooves between them; *spire* very little raised; *lateral line* (extending from the outer whorl to the apex) not convex, but somewhat concave; *mouth* very unequal; *lips* prominent above, adpressed to the preceding whorl beneath; *pillar lip* suddenly reflected, and pressed into the mouth at an acute angle, beneath very acutely concave; *outer lip* a little more prominent in the middle, and within the edge protruded into the mouth; *throat* extremely narrow; *suture* near the mouth suddenly reflected from the preceding whorl, and carinate; *umbilicus* dilated, very small within, and exhibiting a groove on the outer whorl.

Breadth of the female nearly half an inch,
of the male about three-tenths.

Inhabits Florida.

Cabinet of the Academy.

This curious species we found near St. Augustine, East Florida, in a moist situation. They were observed in considerable numbers; the colour is reddish brown, indistinctly banded with whitish lines, sometimes with darker ones, mouth white.

2. P. **avara*. *Shell* covered with numerous short, robust hairs; *spire* convex; *whorls* four, regularly rounded, with hardly elevated lines forming grooves, which

are much more conspicuous near the mouth; *mouth* subreniform, two projecting, obtuse teeth on the outer lip within, separated by a deep sinus; *outer lip* elevated, equal, describing two-thirds of a circle; *pillar lip* elevated, broadly but not profoundly emarginate, concave beneath, and connected by the inner side to an elongated lamelliform tooth, which is placed obliquely on the penultimate whorl, near the middle of the mouth; *lips* almost equally prominent, continued; *umbilicus* moderate, not exhibiting the volutions, no groove on the ultimate whorl within it.

Breadth one fourth of an inch.

Inhabits Florida.

Cabinet of the Academy.

Animal longer than the breadth of the shell, acute behind, above granulated and blackish, beneath, and each side, white.

This we found in the orange groves of Mr. Fatio, on the river St. John, East Florida; it is usually covered with a black, earthy coat, which is probably collected and detained by the hairs. When unincumbered with this vesture, the shell is of a horn colour. It is by no means so common as the preceding species.

S. P. **septemvolva*. *Shell* much depressed, discoidal; *spire* not prominent; *whorls* seven, perfectly lateral, compressed, depressed, and marked with conspicuous lines and grooves above, a projecting carina on the upper edge of the body whorl, beneath which the lines and grooves are obsolete; *aperture* subreniform, not contracted; *lips* equal, elevated, *outer one* reflected, regularly rounded so as to describe two-thirds of a circle, *pillar lip* projecting inwards, into an angle or tooth, which is con-

cave beneath; *beneath*, the four exterior volutions equally prominent, transverse diameters equal to those of the upper surface; *umbilicus* central, moderate, attenuated to the apex so as to exhibit the remaining volutions.

Breadth, Female two-fifths,

Male three-tenths of an inch.

Inhabits Georgia and East Florida.

Cabinet of the Academy.

A very common shell in many parts of Georgia, particularly the sea-islands, also in East Florida. We found them numerous under the ruins of old Fort Picolata on the St. John's river, and on the Oystershell Hammocks, near the sea, and in other situations, under decaying Palmetto logs, roots, &c.

These shells would have been referred by Linné to the genus *Helix*, but as that genus has been limited by Mr. Lamarck, and others, to those shells of which the apertures are broader than long, I cannot, with propriety, in the present state of conchology, consider them as of that genus. Neither can I refer them to either of the genera which have been separated from *Helix* by Messrs. Lamarck, Montfort, &c. by the characters which those naturalists have given of their genera. They differ from others in having the pillar lip elevated considerably above the surface of the penultimate whorl, so as to be equally prominent with the outer lip, with which it forms an uninterrupted continuation, and by the concavities beneath the lips, formed by the protrusion of a portion of the shell into the aperture. In this last character it approaches the genus *Caprinus* of Mr. Montfort, but differs in being umbilicated.

Genus PLANORBIS.

Shell discoidal; *spire* depressed, or concave; *aperture* oblique, rounded, broader than long, visible from above, and emarginated by the convexity of the penultimate whorl; *lips* not reflected; *whorls* lateral.

ANIMAL aquatic, with two filiform tentacula, having the eyes placed at the inner base; *operculum* none.

SPECIES.

P. **glabratus*. *Shell* sinistral; *whorls* about five, glabrous or obsoletely rugose, polished, destitute of any appearance of carina; *spire* perfectly regular, a little concave; *umbilicus* large, regularly and deeply concave, exhibiting all the volutions to the summit; *aperture* declining, remarkably oblique with respect to the transverse diameter.

Breadth nearly nine-tenths of an inch.

Inhabits South Carolina.

Cabinet of the Academy.

Presented to the Academy by Mr. L'Hermenier of Charleston, an intelligent and zealous naturalist; he assured me that this species inhabits near Charleston. It somewhat resembles large specimens of the *P. trivolvis* of the American edition of *Nicholson's Encyc.* but differs in the total absence of carina, and in having a more smooth and polished surface, as well as a declining and more oblique aperture, and a more profound and much more regularly concave umbilicus.

Genus SUCCINEA.

Shell oval; *aperture* oval, much dilated, longer than broad, entire; *outer lip* not reflected; *columella* almost concave, edge acute; *umbilicus* none.

ANIMAL terrestrial, larger than its shell; *tentacula* four, inferior pair smaller; *eyes* placed at the tip of the superior tentacula; *operculum* none.

SPECIES.

S. **campestris*. *Shell* oval, very fragile; *whorls* three, not remarkably oblique, pale yellowish, with opaque white, and vitreous lines, irregularly alternating.

Length not quite three-fifths—breadth seven-twentieths, of an inch.

This shell is extremely common in many parts of the Southern states; it abounds in the sea-islands of Georgia, in the low marshy grounds behind the sand-hills of the coast, where they are destroyed in great numbers by the annual conflagration of the old grass; on Amelia Island, East Florida, I found them in plenty on the highest sandy ground of the island. On Cumberland Island, in Mr. James Shaw's garden, I obtained several specimens from the leaves of radishes.

The resemblance between this species and the *ovalis* is very great; it differs, however, in being less elongated, and of a more robust form; the revolution of the spire is much less oblique, the shell itself is thicker and less fragile.

Animal whitish; *eyes*, inferior tentacula, and a line passing from the eyes, disappearing under the shell, black; a gamboge coloured vitra is visible through that part of the shell which is opposed to the mouth.

Genus POLYPHEMUS. (ACATHINA. Lamarck.)

Shell oblong; *aperture* much longer than broad, perpendicular and parallel to the column; *lip* not reflected;

columella gradually incurved towards the tip; *tip* truncated.

P. *glans*.—This shell furnished De Montfort with the type of his genus *Polyphemus*; he refers to Bruguiere as the first describer of it under the name of *Bulinus glans* in the Encycl. Method. The animal has not been described, but we are informed that it lives in the immense marshes formed by the overflow of the great rivers that water the vast country of Louisiana. In the sea-islands of Georgia we found them numerous in the marshy districts immediately behind the sand-hills of the coast; in Florida in similar situations, and also on the Oystershell Hammocks, and generally in such situations as are tenanted by *Succinea campestris*. The colour of the shell on the spire is chesnut-brown, which gradually and very perceptibly becomes paler to the aperture, aperture occupying about half the length of the shell. On elevated situations they were small, almost transparent, and of a fragile consistence. It is only in low, marshy situations, that they attain their greatest size.

Length two inches and two-fifths—breadth one inch nearly.

Animal elongated, as long again as the shell, granulated; *tentacula* four, superior ones oculiferous, abruptly deflected at tip, beyond the eyes; inferior ones much shorter, and abruptly deflected at tip; *lips*, beneath the tentacula, elongated, palpiform, almost as long as the superior tentacula, retractile, generally more or less recurved, compressed, attenuated, and acute at tip, and forming a considerable interval between their prominent bases.

When the animal is in motion, the elongated lips are used as tentacula to feel the way.

*Genus *OLYGYRA.*

Shell rounded; *aperture* longer than broad, semi-orbicicular, emarginated by the projection of the penultimate whorl; *external lip* reflected; *pillar lip* with obsolete calcareous deposit; *umbilicus* none; *columella* slightly angulated at base.

Animal terrestrial, operculated; *tentacula* two, filiform; *eyes* prominent, placed at the external base of the tentacula; *rostrum* bilabiated at tip, shorter than the tentacula; *foot* simple.

SPECIES.

O. **orbiculata*. *Shell* subglobular; *spire* not prominent, but more than convex; *lateral line* somewhat convex; *whorls* five, obsoletely striated across, regularly rounded, colour pale, greenish, yellowish, or slightly tinted with reddish, particularly on the body, and margined above by an obsolete white line, on the middle of the body a white *vitta* revolves, sometimes obscure or wanting; *aperture* acute, above, regularly rounded at the base, and extending from the centre of revolution or base of the column to an equidistance between the base and the apex of the spire; base of the columella slightly projecting into an obtuse angle; *exterior lip* whitish, reflected.

Length one-fifth of an inch.

Inhabits East Florida.

Cabinet of the Academy.

Animal pale; *rostrum* and *tentacula* blackish, the latter with a white line; *eyes* very black, elevated in form of a short tubercle; length about equal to the breadth of

the shell; *foot* not broader than the body; *tail* rounded, or somewhat acute; *operculum* simple, not spiral, yellowish brown, minutely granulated.

This species we found in great numbers on what are called Oystershell Hammocks,* near the mouth of the river St. John, East Florida, in company with *Polygyra septemvolva*. When in motion, the tentacula are elevated and depressed alternately, as if feeling the way.

This shell is certainly a Linnæan *Helix*, but according to the improvements which have been made in Conchology, since the time of the Swedish naturalist, by Mr. Lamarck, and other systematists, it is at once excluded from that genus and its congeners, by having but two tentacula, and by its operculated aperture; with the genus *Cyclostoma*, as it now stands, our shell has more affinity than it has to any other, but a very distinct generic character is observable in the aperture, which is not orbicular as in *Cyclostoma*, but is almost semi-orbicular, greater in length than in breadth, and the lips widely disunited. In addition to the characters usually given of the animal of *Cyclostoma*, Mr. Cuvier remarks that the tentacula are terminated by obtuse tubercles; no such appendages are annexed to the corresponding members of this animal. Upon these considerations I have thought proper to construct the present genus.

* These are elevated knolls of oyster shells mixed with earth, which rise by an abrupt acclivity on all sides, from the salt marshes in that country, to the elevation of fifteen or twenty feet; they exhibit to the eye the appearance of old oyster beds, (Oyster Rocks) which, owing to their compactness, have resisted the action of the waters for centuries, while the more yielding earth around them has been washed away to its present level, by imperceptible degrees.

*Essay on the FORMATION OF ROCKS, or an Inquiry into
the probable Origin of their present Form and Struc-
ture. By William Maclure, Continued.*

Nature composes, forms, or aggregates those rocks either by mechanical deposition, as in sand, gravel, or clay, Nos. 1, 2 & 3; by precipitation from a chemical solution, as in Nos. 9, 10 & 11; or by a mixture of both modes of aggregation, as in Nos. 4, 5, 6, 7, and 8. These aggregations of sandstone, puddingstone &c, are more or less hard and adhesive, according to the nature of the precipitate which unites them; and nearly resemble the aggregates in the 2d order: but the depositions of impalpable powder, such as Clays &c, generally remain in a soft state, having less resemblance to the slaty and argillaceous rocks of the other orders of Neptunian origin. The calcareous precipitations are not generally so hard and adhesive as those of the second order, though they have much the same texture and external appearance; but the siliceous precipitations in petrified wood, and other forms, are equally hard and compact, having a direct analogy with the siliceous rocks of the second order; they are likewise the only species of rocks, positively known to be of Neptunian origin, which resemble a little in texture, hardness and external appearance, many of those of volcanic origin.

Rocks of the following description, may be considered of Neptunian origin by positive and rational analogy, viz.

Those containing shells and other animals, known only to exist in water, or the remains of other organic matter, destructible by fire.

Aggregates of sand or gravel, rounded by attrition,
Vol. I. U

resembling those formed every day by the action of the sea, rivers and lakes.

Substances, whose structure and component parts are similar to those formed by the depositions of lakes, springs &c. which are evident to our senses and daily observations.

Substances, alternating and intimately mixed with all, or any, of the above description, provided, nothing similar has yet been found in those, which are of undoubted volcanic origin.

FIRST CLASS.

ORDER II.

Of the Neptunian origin.

12. *Coal formation.* The series of aggregates which constitute this formation, are evidently of aqueous origin: the Puddingstone and Sandstone, are composed of particles rounded by attrition; and as well as the Slaty Clay, Bituminous Slate &c. contain the impressions of vegetable and other organic matter, which are, as well as the coal itself, destructible by fire, rendering the analogy conclusive.

They are generally found in hollows or low situations, when compared with the surrounding strata, which may be called basins or depots, and may be divided into three different basins or depots, according to the different nature of the rocks, which form the basins or foundation on which the formation lies.

The first is the deposit in calcareous basins, or reposing on the foot of the compact calcareous mountains; such as the coals at New-Castle and Whitehaven, in

the counties of Yorkshire, Lancashire, Cheshire, and in fact, the greatest part of the coals wrought in England, with the exception of some fields in Wales, which are in primitive basins ; the coals in Poland, on the foot of the compact limestone of the Carpathian mountains, through Silesia, and following the calcareous chain through Germany to the Hartz ; the coals at Aix la Chapelle and Liege ; and perhaps all the coals in Flanders, may be found to repose in calcareous basins, or to crop out at the foot of calcareous hills. The immense beds of coal lying upon secondary limestone west of the Alleghany mountains in North America, are likewise of this description. This is, perhaps, the most extensive and regular of the coal formations ; the beds are generally of a moderate thickness, or from one to six feet ; of great extent ; a great number lying one under the other, even to 20 or 30 beds ; and alternating principally with slaty clay and sandstone, with little or no Puddingstone. The argillaceous Ironstone so frequently wrought as an iron ore in England, is found in beds of clay in this formation.

The second repository or deposit, is found in the hollows or valleys in the primitive formation, such as the coals near Nantz, on the Allier, St. Etienne, and Rive du Gui, in France ; Richmond, in the United States of America, &c. &c. These deposits are generally less extensive than the first ; they are in clusters or heaps of 40 or 50 feet thick, without any regularity in the stratification ; often after working a 40 or 50 feet bed, it runs out to a thread in 50 or 100 yards, and recommences in another place. They alternate with, and are covered by, a great proportion of Puddingstone, and

Sandstone, and a much less proportion of slaty clay, and argil, than the first kind of deposits.

The third kind of repositories or deposits, are not so regular as the other two, and more difficult to define. They are generally found at the foot of those ranges of mountains, where the old red sandstone takes the place of the compact limestone, on the flank of the primitive; such as the coals on the south side of the mountains in Bohemia—along the chain of the Vosges—parts of those found in the south of France—and in Scotland.

The stratification of this deposit of coal, is neither extensive nor regular. It is often interrupted and broken, having frequently basalt in its neighbourhood, or the trap formation, which in some places covers it. It is also covered by, and alternates with, a greater proportion of sandstone; and there are comparatively, perhaps, fewer vegetable impressions, or the remains of organic matter, in the accompanying stratification.

From all this it may reasonably be concluded, that at the time these coal formations took place, the surface of the earth was partly covered by primitive, partly by transition, and partly by secondary rocks, as we find it at present.

13. *Gypsum.* This formation seems to partake of Neptunian origin, by its including the remains of organic matter; alternating with aggregates of rocks rounded by attrition, containing shells; and being found generally in a more crystalline form than the other rocks of this class, owing perhaps, to its great solubility in water; it occupies the lower situations,

and is not found in mountainous countries. Such is the gypsum round Paris, at Luneburgh, and in Holstein. Perhaps some of the extensive formations of gypsum in Spain, and that in the vicinity of Jena, in Saxony, may belong to this formation.

The remains of animals have, I believe, only been found, as yet, in the extensive gypsum quarries in the vicinity of Paris; in almost any other situation, except the vicinity of a large town, it is probable that the few specimens containing such organic matter might have remained unnoticed for ages; which shows how deficient we are in the necessary knowledge of the actual state of the substances within the reach of our observation; and how few are the positive facts on which the narrow foundation of our general and sweeping systems of the earth's formation must rest.

14. *Coarse-grained Shell Limestone*, consisting of the remains of organic matter, which are now only found to exist in water, sufficiently proves its Neptunian origin, as well as that of all its accompanying strata; the silex found alternating or touching this formation, has often the impressions of organic matter, and has always the structure of the siliceous precipitates found in the first order of the Neptunian rocks.

This formation generally occupies the lower levels: it is seldom found in mountainous countries; it covers immediately both primitive and other more recent formations; it is found both in extensive and partial beds; and varies only in the nature of the shells it contains; the rock itself being much the same, either a coarse

aggregate of sand and calcareous matter, resembling the calcareous tuffa of the first order of Neptunian rocks, or a kind of indurated marle, not much different in some places from chalk.

15. *Chalk formation* is analogous in structure and component parts to the disposition and precipitations of Nos. 3 and 9 of the first order of Neptunian rocks; it contains calcareous and siliceous petrifications of organic matter, with pyrites, as in Nos. 8 and 11, so that it unites most of the different modes of precipitation, and deposition, we have observed to be followed by nature in the formation of rocks of the first order; except the aggregates of particles rounded by attrition.

Its situation is generally in flat or level countries, seldom or never found in mountainous, occupies in general extensive fields, as from the east part of Champaigne in France, to near Bath in England; and from Flanders to the vicinity of Orleans; with some interruptions common to most formations. It is seldom or never found alternating with compact limestone, or with coal, or sea salts. Iron seems as yet the only metal it contains, and it is seldom or never found alternating with any kind of shist, or having any distinct or uniform stratification.

16. *Compact Limestone* resembles in structure and component parts No. 10 of the first order: it contains shells and organic remains of animals found at present to exist only in water, and of course it is by direct analogy of Neptunian origin.

This is one of the most powerful and extensive formations we know. The history of it alone would require a volume. It is found either in detached secondary hills or ranges, (as the ridges that cross England through Derbyshire) or lying on the flank of primitive or transition mountains, as the immense curtain which skirts the north and west side of the Carpathian, Bohemian, Tyrolean, and Alpine mountains, from the Black Sea to the borders of the Mediterranean; and the powerful and extensive beds which line the basin of the Mississippi on the west side of the Alleghany mountains in North America.

Where the stratum is very thick, the rock is solid and compact, containing little or no shells or other organic matter; but when the shells abound, the stratum is thinner, and the beds of shells, with some mixture of argillaceous deposits, are found in greatest quantities between the strata. These are often broken and irregular, from the great number of excavations and caverns they contain, through which run subterraneous rivers, washing away the limestone, and deranging the originally horizontal strata.

There are great varieties in the colour; the fracture is sometimes earthy, but more frequently smooth, and conchoidal. It appears to be mixed with a greater quantity of depositions of impalpable argil or silex, than the limestone with small grains of the transition formation, which appears to be a purer crystalline precipitate, and not so generally mixed with other earths, not chemically dissolved.

The silex contained in this formation, is found generally near the tops of the mountains in the upper

strata, either in detached rounded masses, or in thin strata, and follows the colour of the limestone. When red, the silex is also red, as on *Monte Baldy*; where the limestone is blue, the silex is generally of a dark blackish colour, it is mixed and rather of a lighter colour when the limestone approaches to white.

17. *Sandstone* in beds, independent of other formations, contains often the impressions of shells. The calcareous matter of the shell is generally washed away, and perhaps helps to form the cement. Being an aggregate of particles of rocks rounded by attrition, it must be considered as of Neptunian origin, though in some instances the sand may be heaped together by the wind as well as by the water.

This formation is not very extensive, covering the foot of the compact calcareous hills, or partially accompanying vales or lower situations; it often hardens by exposure to the air, and remains divided into high and massive pillars, as on the south side of the mountains in Bohemia near Abernach; or in long dikes, as what is called the Devil's dike, at the foot of the Hartz; it constitutes considerable ridges in the basin of the Mississippi; and in lower situations, where it covers the limestone, it is impregnated with from 10 to 20 per cent. of native nitre, and large masses of pure nitre have been found included in the sandstone in the state of Kentucky, North America.

18. *Puddingstone* formed of pebbles rounded by attrition, and including (though not frequently) the remains of organic matter, must be considered of Nep-

tunian origin. It is found aggregated at the foot of mountains, and occupying vallies, both in the mountains and level countries. It likewise constitutes ranges of mountains of considerable height and extent, as from the lake of Wallastein to near Berne in Switzerland, which includes the Rigaberg, a mountain of nearly 4000 feet above the level of the sea. Montserrat, in Spain, is part of a broken mountainous formation of puddingstone, nearly 30 leagues in extent.

In these puddingstones have been found rounded masses of puddingstone of a prior formation ; and in those rounded masses, pebbles of puddingstone of a still more ancient date.

19. *Rock-Salt* resembling that we find formed by evaporation on the surface of the earth, and at the bottom of lakes and ponds, alternates with clay sandstone and gypsum. This compells us to include it in the rocks of Neptunian origin, though the nature of the substance itself does not exclusively prove such an origin.

It is found in irregular masses, and disseminated in argil and sandstone, on the edge of the secondary rocks at Cracow, and along the foot of the Carpathian mountains in Poland ; likewise at Hal and Saltzburgh at the foot of the Tyrolian mountains. At Cordona in Spain, and many other places, it is included in the red sandstone formation.

The principal depots of salt in England, are on a line running nearly south from Northwich to Droitwich, parallel to, and not far distant from, the transition rocks in Wales.

20. *Gypsum* resembling in structure and component parts the gypsum of the alluvial, alternating with clay, and other rocks of the Neptunian formation, in which the remains of organic matter have been found, must be considered as proof of its Neptunian origin.

This gypsum is generally found in the vicinity of mountains, as round the foot of the Hartz, and contains sulphur. It is also found near to Cracow in Poland, in Murcia, Granada, and at Conila, in Spain. It has quartz and arragonite crystals imbedded in it in the provinces of Arragon and Valencia, in Spain, in which kingdom this formation is extensive, but much broken and confused, having its stratification irregular and deranged, so as to be difficult to ascertain the relative situation. It is probable that the gypsum near Cognac in France, and that near Chalons on the Saone, are likewise of the same formation.

21. *Sandstone* with an iron ochrey cement. This resembles the other sandstone formation, being composed of particles of rocks rounded by attrition; in some places forming puddingstone, the sandstone serving as the cement. It includes and alternates with clay in a soft state, and with gypsum. The remains of organic matter, though rare, have been found in it, which renders the analogy conclusive, of its being of Neptunian origin.

This, like all the other sandstone formation, is liable to be washed away when exposed to the weather, and is then found in broken and detached pieces, when not protected by some more solid covering. These de-

tached fragments require some observation, to unite and reduce to one general formation; with this necessary attention, it will be found to be rather an extensive formation, as it is in North America, covering indiscriminately different kinds of the primitive, from Connecticut River to the Rappahanock, nearly 150 leagues. On both sides of the Vosges to beyond Treves, it generally reposes on the porphyry, covering the porphyry of the chain of mountains in the black-forest opposite the chain of the Vosges, and equally covering the porphyry on the south side of Tyrol, from the valley of Falsa, to near Bergamo, and perhaps farther, as the same porphyry lies upon the gneiss on Lago Majore, though there the sandstone is wanting, perhaps from being washed away.

As this formation has been taken for the graywacke, and graywacke shist, by some mineralogists, it may not be useless to give here a description of the points in which they resemble, and the properties wherein they differ, according as I have observed them.

These two formations resemble each other in being united by a cement consisting mostly of argil, and taking the appearance of clay slate, when the cement abounds either in the sand stone or puddings. This sandstone likewise, as in the graywacke shist, takes a shistoze appearance, with particles of clay slate, when the cement predominates; and in situation, it is immediately following the primitive, like the graywacke shist and other transition rocks.

The two formations differ in colour; the red sandstone cement containing a considerable quantity of the red oxide of iron; in hardness, the red sandstone being

much softer and less adhesive. The red sandstone has no veins of calc spar crossing the stratification, whereas the graywacke shist is generally full of little veins or threads of calc spar, crossing the strata in all directions, and alternates with beds of compact, small-grained limestone, full of the same veins of calc spar; the red sandstone has no such limestone; but a thin stratum of a kind of argillaceous limestone or indurated marble, occasionally divides the strata of sandstone; the graywacke shist runs into, and alternates with, clay slate, and roofing slate, and goes by a gradual transition into the primitive slate and hornblende rocks, but the red sandstone has no clay or roofing slate in or near it, and generally lies upon the primitive, without any gradation of transition; it is seldom or never found near the graywacke, nor often on the same side of the range of mountains, though when there is no graywacke, or other transition rocks, it occupies their place, and covers immediately the primitive.

The gypsum found in the red sandstone is in thin strata, alternating with much clay in a soft state; the stratum of gypsum in the transition is powerful and extensive, with the little argil it contains generally in the form of a shist or slate.

The above remarks may perhaps be applicable to what is called in France the *Gres de Houillier*, a sandstone of the coal formation, which in Flanders, and other coal countries, has some appearance of graywacke shist, and has been taken for such by many mineralogists. This *Gres de Houillier* is generally composed of sand, with small plates of mica, of a shistoze structure, but is much softer, and in general the cement not so shistoze, nor does it alternate with any of

the rocks generally found accompanying the gray-wacke shist; and though it is like the red sandstone, and has some resemblance to the formation of gray-wacke shist, yet the difference both in structure and position must perhaps exclude it from those formations.

Transition Neptunian Rocks.

THE character which distinguishes this from the secondary, may perhaps be the nature and arrangement of the cements; in the aggregates of the secondary this cement is produced by infiltration; the rounded particles generally touch each other, but in the transition, the particles when small, appear to have been swimming or floating in the cement, which seems to have prevented them from touching, and usually forms a more homogeneous mass. When the particles are large, gravitation may have overcome the resistance of the cement, and they touch; but even then the cement occupies more of the space, than in the puddings of the secondary.

The stratification of the transition rocks, seems to constitute another dividing characteristick, being generally at a dip from the horizon, and seldom or ever found horizontal; but the limits near the dividing line will, perhaps, for a long time remain doubtful.

The clay found in the sandstone of the secondary is generally in a soft state, earthy in its fracture, and has little or no resemblance to the slate, and other argillaceous rocks, mixed and alternating with the transition aggregates.

The word *transition* may not be so appropriate as *intermediate*; though in many situations the passage from these rocks to what are called primitive, is so gradual, as to render it difficult to draw the line of separation.

The application of the term transition was made by those who first introduced the division, and described the rocks included in it; whereas "intermediate" has been adopted without any regular classification of the rocks meant to be included under the denomination; from which it is probable, that in the present state of our knowledge, transition being better defined, will be better understood, which constitutes the principal utility of all names, whether of rocks or other substances.

22. *Graywacke*, an aggregate of small fragments or particles of rocks, most frequently rounded by friction or attrition; and though not generally containing the remains of organic matter itself, yet, as it alternates with other rocks in which organic matter has been found, it must be ranked by analogy as of Neptunian origin.

There are, perhaps, three species of rocks included in the above; which though united in the same kind of formation, by containing particles of rocks rounded by attrition, yet differ in the nature and relative quantity of the cement which unites them, as well as in their relative situation.

The first, and perhaps the most common, is an aggregate of different species of rounded rocks, where the cement bears a small proportion to the quantity of par-

ticles aggregated; of this kind is the graywacke of the Hartz in Saxony, and generally that species of graywacke which alternates with graywacke shist.

The second is an aggregate with a small-grained, rather crystalline, cement of a greenish colour, resembling a little some kinds of chlorite, which cement forms a great proportion of the rock, as in the range north of Vigo, and Bleyburg in Tyrol.

The other is an aggregate of rounded quartz, seldom exceeding the size of a walnut, in a shistoze cement, inclining to be fibrous, the cement forming the principal mass of the rock ; as the rock generally found on the borders of the primitive, the first aggregate in the transition formation on the west side of the primitive ridge in North America, in which the quartz is generally of a light blue colour. I found in the valley of Durasa, south of Mount Rose, a rock of the same nature.

23. *Graywacke shist*, an aggregate of small particles of rocks rounded by attrition, united by a cement more or less shistoze, having remains of organic matter, (though rarely) found in it ; and being consequently of Neptunian origin.

This formation, though often accompanying the graywacke, yet is much more general and extensive ; it covers the north side of the Carpathian and Bohemian chain of mountains, as well as the Tyrolean and Switz Alps ; increasing in force as it proceeds south along the mountains in Dauphiny ; it probably covers the whole chain after you pass Mount Cenis, and consti-

tutes the greatest proportion of the Appenines from Genoa to beyond Naples.

In North America it forms the passage between the primitive and secondary, along the whole chain of mountains from north-east to south-west, on the west side of the Alleghany; and as it were lines or sheaths the primitive along the edges of the great basin of the Mississippi, and supports the great secondary calcareous formation, which fills or occupies that basin.

It constitutes part of the mountains of the Crimea; surrounds the primitive mountains of the Hartz; is found in Wales, and Cumberland, in England; and it is probable that there are few primitive mountains in Europe, between the latitudes of 50 and 60 degrees, which are not covered on one side or the other by this formation.

The above general observations on the locality, includes the rocks which accompany and alternate with the graywacke shist, such as the clay slate of transition, the various stratification of limestone, sometimes intimately mixed in thin strata, from half an inch to two inches in thickness, and at other places alternating in powerful beds, forming almost entire mountains. Considering the graywacke shist as the most general, and best characterized, of all the members of the transition family, to avoid repetition, it were perhaps as well to place the general observations under that head.

The chain of the Ardennes is almost entirely composed of this formation, which, on the Rhine, and other places, furnishes considerable quarries of roofing slate.

24. *Sandstone* of transition, an aggregate of small particles rounded by attrition, united generally by a siliceous cement, alternating with clay-slate and gray-wacke shist. This rock has been found to contain the remains of organic matter, and must therefore be considered of Neptunian origin.

This is rather a partial formation, found generally in thin strata, alternating with the transition shist, though it forms in some places west of the Alleghany mountains, in North America, considerable ranges of small hills, and constitutes a great proportion of the rolled pebbles found in rivers which run over the transition formation.

25. *Limestone* of transition, resembling a little the limestone by precipitation of the first order, though not so similar as that of the secondary; and containing, though in small quantities, shells and the remains of other organic matter, which shew it to be of Neptunian origin.

This limestone is mixed with the graywacke, and clay slates, in almost every proportion, from the thinnest shistoze stratification, to the most powerful and solid beds; forming immense blocks free from cracks or fissures; and it is probable, that the small grained statuary marble both of Italy and Greece, belongs to this formation. When this formation touches the compact secondary limestone, without any intervention of graywacke shist or slaty rocks, the passage is gradual and almost imperceptible, leaving much doubt and difficulty about the place where the line of separation ought to be drawn. It is of all the members of the transition

formation, the one which most resembles in structure those of the secondary.

26. *Gypsum* of transition, resembling in component parts, though differing a little in structure from, the gypsum of alluvial and secondary : as it alternates and is mixed with clay slate, in which the remains of organic matter has been found, this connects it with the rocks of Neptunian origin.

This is a considerable formation, generally found in mountainous countries ; and from the facility with which it is dissolved by water, is in a broken and confused state, often out of its original place, which is perhaps the reason it has been so often supposed to be inclosed in primitive rocks, which the result of all my observations incline me to doubt.

It is probable that all the gypsum in Tuscany belongs to this formation ; the powerful bed on the top of mount Cenis, I should think also of the same species. This gypsum having on each side a blue limestone, with dark coloured shist alternating with calc-spar, it seems to be connected with the transition rocks, as well as the many powerful beds which are found in the valley of Lanz, from Lanz le Bourg to *Aiguebelle*.

The gypsum found in the valley between St. Martins and Sion, in the Switz Alps, is surrounded by what I consider transition rocks ; and that perhaps in the valley of Chamouny, and in the pass between Airolo and Desentis, from the nature of surrounding rocks, must be classed in the gypsum of transition. As these three last mentioned localities are in a line, running nearly with the stratification of the chain of mountains,

it is probable that they are only the remains of an immense bed of gypsum, which might at one time have occupied some part of the space where those passes and valleys are formed.

This gypsum has a small crystalline grain, with little or none of the fibrous or lamellar crystallized gypsum so common in the formations of the secondary class.

27. *Clay slate* of transition. This shistoze formation, containing and alternating with strata which contain impressions of vegetables, and, in some places, of animals, must be considered as of Neptunian origin.

A great variety of rocks, principally of a shistoze structure, are included in this formation. They alternate with shistoze limestone of transition, having small veins of calc spar crossing the strata, the shist often composed of small detached plates of mica, or what has lately been called talc, and in some places small veins of quartz intersecting the strata. It has the exterior form of gneiss, when the thin strata of blue calcareous shist, and plates of calc spar, in segments of unequal thickness, alternate with each other in the direction of the stratification.

Roofing slate generally alternates with this formation; and from its being best known, has contributed, in a great measure, to include the others in the transition class. Being a necessary article for the covering of houses, it has occasioned considerable quarries and excavations to be made in almost every country. In the course of working and splitting the slate, impressions of vegetables, fish, &c. &c. were found, which probably

would not have been discovered had the roofing slate, like the other shist, been unfit for the covering of houses; as the mode of decomposition on the surface would have destroyed those impressions, they might have remained for centuries before we could have observed them; and all this shist formation would have been then considered as belonging to the primitive; and as originating before the existence of any organic matter.

May not our wants, compelling us to quarry other rocks, joined to a much more accurate mode of examination, discover the remains of organic matter in rocks until now considered primitive; which might entirely change all the present theories of the formation of the earth, and prove how dependent those conjectural theories are on the smallest discovery that might be made by the attention and observation of a stone-mason?

I found the roofing slate near St. Maria, not far from the gypsum, between Airolo and Disentis, to be a black carbonated transition slate; on the passage of the Fourche; roofing slate containing pyritous impressions of fish, at Blattenburg; half a league from Matt, in the Canton of Glaris; roofing slate, containing shells, near Meyrungen in the Canton of Berne; roofing slate at Angers; the Ardennes; in Wales, in England; in various parts of the transition in the United States of America, &c. and most probably to be found in some part of every considerable formation of transition; though the knowledge and industry of the inhabitants, may not have yet applied the slate to any useful purpose, and of course it lies concealed in the mass of other rocks, till now considered of no use, unwrought and unknown.

28. Anthracite being a combustible, and found alternating with shist, having vegetable impressions, though rare, must be considered of Neptunian origin. Two kinds of anthracite have been found within the United States of America ; one rather granular, of a grayish colour, and slight metallic appearance, containing small veins of quartz ; the other blacker and more shining, resembling more the common coal in appearance.

This formation in the United States of America, has been generally attended with a satiny transition slate, bearing impressions of vegetables, a rather hard species of allum slate, and strata of black chalk, as in Spain, which is included likewise in transition slate formation ; it has been said to exist in the primitive in some parts of Europe, but in no place where I have had occasion to examine the situation of the anthracite have I found primitive rocks covering or overlaying this formation ; though in some places they might serve as the foundation to it. I have likewise near Edinburgh, in Hungary, and in France near Tulle, examined the common bituminous coal formation, which was said to alternate, and to be covered, with primitive rocks ; but found it only in appearance, from the derangement of the original situation of the strata in both places : agreeably to my observation they were the remains of a coal formation in a primitive valley, which had undergone considerable revolutions, so as to leave only a few dislocated fragments of the former stratification.

29. *Siliceous shist*, (Keiselshieffer) and jasper, are placed here from their resemblance to the siliceous precipitations of the secondary class of Neptunian rocks, and alternating with some of the rocks of the transition class.

The leading features of the foregoing formations are, a very great extension both in length and breadth, in proportion to their depth and thickness, dividing into horizontal strata, or at a small inclination, seldom divided by vertical fissures, and continuing through the whole strata without any great change in the structure or external appearance of the substances. This formation may be found to occupy generally between the 20th. and 55th. degrees of latitude, whilst the primitive may be found to predominate towards the Poles. *

May the proper proportion of heat and moisture, necessary to the production of organic matter, in the middle and southern latitudes, be one reason why we find there the formations which contain, and are partly composed of, such matter in great abundance? or the absence of heat towards the Poles, be one of the causes why those formations are not found therein the same proportion, but consist principally of the primitive?

While little or none of Asia, Africa, and perhaps not one third of Europe, and still less of America, have been examined by mineralogists having a knowledge

* Should future experience and observation demonstrate that Nature has accumulated the greatest proportion of the secondary formation in the middle and tropical latitudes, and for the same reason continues to heap upon the surface in these latitudes the matter consolidated by the action of animal and vegetable life; would this not tend to augment the diameter of the globe at those places, and of course give the appearance of flatness to the poles?

of rocks, one runs the risk of generalizing too much in the present state of our knowledge, and of finding the greater part of future discoveries, contradicting our principles of generalization.

The metallic repositories contained in the rocks of Neptunian origin, have a great resemblance, both in substance and situation, to those found in the primitive class; it is perhaps one of the strongest features of connection which approximates those two classes, and will be considered along with the rocks of the primitive class.

The volcanic rocks are rather more embarrassing, not from the nature of the rocks themselves, which in situation are consistent and uniform, and in texture, and external characters, better marked, united by stronger features of family connection, than the Neptunian rocks—but from the complicated state of the nomenclature, arising out of the dispute about their origin. The generic name *Lava*, simplifies the nomenclature adopted by the Volcanists, while the Neptunians admitting of few lavas, except those ejected from volcanoes at present in action, have been forced to give other names to the great variety of rocks produced by volcanoes now extinct, or united by strong analogy to the same origin.

CLASS II.

ORDER I.

Rocks of Volcanic origin.

Thrown out of active volcanoes, the origin of whose formation rests on the evidence of our senses.

There are two modes of examining rocks; one, the investigation of their external appearance, and internal structure, which can be accomplished with hand specimens in a cabinet, and belongs properly to mineralogy; the other is the tracing, upon an extensive scale, the relative position of their beds, whether stratified or divided by vertical fissures; if stratified, whether horizontal or at a dip from the horizon, whether the stratification is regular, occupying large fields of extensive countries, or consisting of detached insulated masses, with vertical fissures, partially scattered on the surface of all the other formations, &c. : this perhaps belongs to geology, and cannot be studied in the cabinet, but requires much practice in the mountains, hammer in hand.

Lavas thrown out from recent volcanoes are various in their fractures; they contain a number of insulated crystals; and are composed of a variety of different substances; but have one general distinguishing mark, which runs through the whole, and separates them from rocks of Neptunian origin: this mark

is a roughness and asperity in the structure, owing to their half vitrification, and numberless small pores which they contain ; this asperity is softened down by age. Old lavas by infiltration, and absorption of water, with the different substances that accompany it, put on a milder and more unctuous structure, and approach nearer the structure of Neptunian rocks.

Currents of lava flowing from the crater as a centre, towards the circumference, are irregular and abrupt in their relative position with surrounding formations ; they have no marks of stratification ; when divided it is always by vertical fissures ; they are found in detached masses or long ridges, of a considerable thickness in proportion to their width ; occupying the inequalities of the surface of all formations whereon they lie, and with which they seem to have nothing in common.

Mineralogists have divided the lavas into different species, according to the different substances which compose the mass of the rock ; others have classed them according to the different crystals they contain ; but these distinctions in no wise affect their origin, and are foreign to the present subject.

The total absence of metallic veins in lavas, forms a mark of distinction between the two origins. Some iron has been found disseminated in the cavities, in the form of specular iron ore, which is evidently formed by evaporation, but in small quantities scattered through the porous lavas,

Submarine eruptions are common, as is proved by the number of islands thrown up under the evidence of our senses ; and the still greater number of islands that apparently, and by direct analogy, have been pro-

duced by submarine eruptions, though the periods of their formation were long before the date of our records. It is under such circumstances that the alternation of the Neptunian and Volcanic formations most frequently takes place, as in the islands of Dominiqua, St. Christopher, and St. Eustatia, in the West Indies; the fish and shells found in the lava in the Vincentin, &c. so that the finding of a bed of shell limestone between two currents of lava, would be agreeable to the laws of nature, and no deviation from the common order of things.

(*To be continued.*)

Observations on a new Genus of Fossil Shells.
By C. A. Le Sueur. Read June 30, 1818.

THE secondary blue limestone of which the great basin is composed, which extends from the Alleghany Mountains to Lake Superior, and from Saratoga to the Mississippi, includes numerous fossil shells, which, in some of the strata, are almost exclusively of a single species of *Terebratula*; other species of this genus, equally numerous in individuals, form other strata, mixed with *Encrimites*, *Alcyonites*, *Caryophilites*, *Favosites*, *Gyronites*, &c. In another stratum is found the *Alcyonite*, *Trilobite*, a *Terebratula* with flat valves, a *Favosite*, &c.; and a large discoidal shell, which more particularly forms the subject of this paper, and which at first sight resembles

an Ammonite, or Nautilus ; and was noticed as such by Mr. Maclure in his geological observations, page 27. We first observed an impression of it in the compact limestone which forms a portion of the bank of Lake Erie, near Eighteenmile creek, mixed with Caryophillaea, and subsequently at Basin Harbour, on Lake Champlain, where several more perfect individuals occurred ; several good specimens were lately sent by a gentleman of Kentucky, to the Philosophical Society, one of them, an impression, 10 or 12 inches in diameter, and another exhibiting a perfect vertical section.

Mr. Samuel Hazard, a member of the Academy, presented to our cabinet a collection of fossils collected by himself, in Kentucky, amongst which were some specimens of this shell. Sometime afterwards Mr. Clifford, of Kentucky, presented me with fine specimens which he brought from Tennessee river.

A careful examination of all these individuals, in their several states of preservation, presented to me the common characters of a discoidal form, flat spire, very large umbilicus, and entire cavity ; the last trait distinguishes them from *Nautilus*. The genera to which it makes the nearest approach are *Solarium* and *Delphinus* of Lamarck, but it is separable from them by the characters by which I indicate this new genus.

Genus *MACLURITE.*Generic Character.*

Shell discoidal, much depressed, unilocular; *spire* not elevated, flat; *umbilicus* very large, with a groove formed by the projection of the preceding whorls, not crenulated.

Species.

1. **M. *magna.** *Shell* obtusely carinated on the exterior upper edge; *whorls* rapidly increasing in size; *aperture* on the left, irregularly oval, horizontally depressed above; *lips* not reflected.

My Cabinet, Cabinet of the Academy, and of the Philosophical Society.

Plate 13; fig. 1. Upper surface of the *M. magna* exhibiting *a*, the remains of the shell, *b*, the cast, *c*, thickness of the shell.

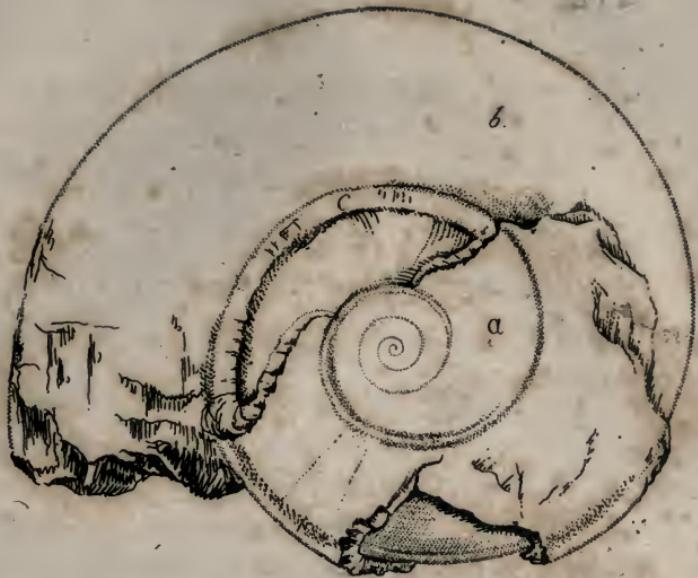
Fig. 2. A vertical section—*a*, outer lip, *b*, umbilicus.

Fig. 3. Under part of the shell.

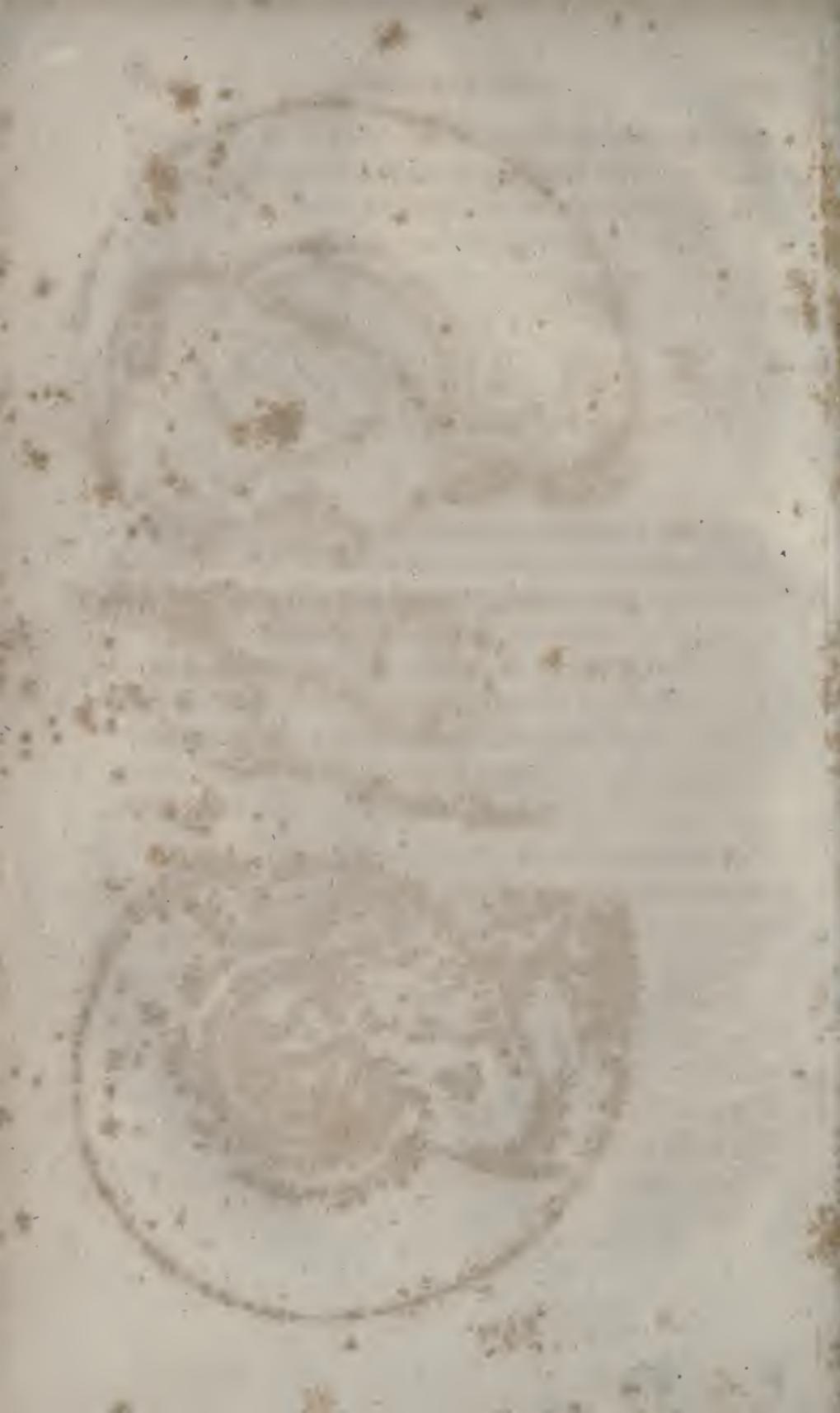
2. **M. bicarinata.** *Whorls* acutely carinated on the middle above, and obsoletely carinated beneath; *aperture* on the right.

Cabinet of the Academy.

Parkinson's Organic Remains, vol. 3, page 76, pl. 6, fig. 1 and 3.



C. H. Le Sueur D. 9. inc.



An excellent specimen of this shell occurs in the collection of the Academy presented by Mr. O'Kelly, of Dublin, Ireland.

An Account of the Crustacea of the United States.

By Thomas Say. Read June 10, 1818.

(Continued)

Genus *DIASTYLIS †

Essential Character.

Feet bifid; antennæ destitute of accessory scales; tail with a single bifid style on each side of the first segment, second segment terminated by a simple one.

Natural Character.

Thorax six-jointed, anterior one much larger than the others conjunctly, laterally deflected, compressed, embracing the sides, and rostrated; *rostrum* permanent, concave beneath, concealing the base of the intermediate antennæ; *antennæ* four, placed on nearly the same horizontal line, inner ones four-jointed, three basal joints robust, first and second subequal, very short, concealed by the rostrum, third joint articulated, as long as the two preceding ones conjunctly, bifid, inferior division much shorter, exterior antennæ simple, longer than the inter-

† In allusion to the caudal appendices.

mediate ones, basal joint robust, without a scale, terminal joint articulated; *external pedipalpi* very large, pediform, nearly attaining the front, first joint very much elongated, compressed, remaining joints very small, cylindrical, subequal; *feet* five pairs, bifid, anterior pair truncate at tip, shorter than the external pedipalpi, second pair acuminate, third, fourth, and fifth pairs reflected, acuminate, destitute of nails, armed towards the tip with robust hairs; *abdomen* five-jointed, cylindric, much narrower than the thorax, four anterior joints subequal, fifth rather longer, first and second segments furnished beneath with natatory feet; *tail* articulate, first joint with a lateral style, composed of a cylindrical peduncle and bifid, short seta, second joint smaller than the preceding, terminated by a simple cylindrical style.

Species.

D. **arenarius*. *Thorax* above a little undulated, glabrous, as long as the abdomen and tail conjunctly, edge each side before minutely crenate; *rostrum* short, obtuse, triangular; intermediate antennæ two thirds the length of the first joint of the thorax, inferior seta less than half as long as the superior one, exterior antennæ longer than the first joint of the thorax, basal joint attaining the tip of the third joint of the inner antennæ; *lateral caudal styles* divaricated, longer than the tail, peduncles somewhat dilated at tip, setæ half as long as the peduncle, and appearing articulated, terminal style less than half the length of the lateral ones.

Length one fifth of an inch.

Inhabits Coast of Georgia and Florida.

Cabinet of the Academy.

I think there is little doubt of this animal being congeneric with *Cancer scorpioides*, described by Montagu in the seventh volume of the *Trans. Lin. Soc. of Lond.*, and indistinctly represented on plate sixth of that instructive work. The general appearance, particularly of the posterior part of the body in that figure, its curve, the caudal appendices &c., is very similar to that of the species upon which I have constructed this genus. The author in describing it observes, that it was a mutilated specimen, but the only one he had seen; “the head or fore part was wanting, consequently no eyes nor antennæ could be observed; but the rudiment of arms on the fore part of the body” &c. Notwithstanding these remarks of that intelligent observer, I am led to believe, by comparing his figure and description with this animal, and judging from the analogy between them, that it was nearly complete, wanting only the intermediate antennæ. But it is necessary to remark, that in our animal there is no distinct head, unless that part of the body can be considered as such, which I have called the first segment of the thorax; this is the more probable since neither of the five pairs of feet which I have enumerated, are distinctly perceived to arise from that part. It is true, that those members which Mr. Montagu has called “rudiments of arms,” most obviously have their origin there; yet these, although much larger than either of the feet, and equidistant from the two anterior pairs, I have supposed, from their form and apparent position, to be no

other than palpi, and have described them as such. Immediately under these external pedipalps is a much smaller distinct and filiform pair. The exterior antennæ are concealed each side beneath the deflected margins of the thorax. The eyes are probably very retractile, and placed below the antennæ: I did not discover them.

I found but a single individual in a handful of sand taken from one of those pools which are frequented by *Lepidactalis*,

f *Cancer esca*, Gmel., an inhabitant of the Norway sea, said to be the chief food of the Herring, will, judging from the description, form a third species of this genus. Mr. Montagu considered it similar to *C. scorpioides*.

By the bifid feet *Diastylis* claims kindred to the genera *Mysis* and *Nebalia*; and when placed immediately in succession to the latter, will contribute another link, by which the *Macrouræ*, through the medium of the *Schizopodæ*, are connected to the *Monoculii* by *Cyclops*, the most proximate of the genera of that order.

ORDER III.

AMPHIPODA. *Latr.*

Head distinct from the thorax, and simple; eyes immoveable, fixed in the shell; mandibles palpigerous, three pairs of maxillæ, exterior ones resembling a lip

with two palpi or two small feet united at the base; branchiæ vesicular, and situate at the inner base of the feet, with the exception of the anterior pair.

*Genus *LANCEOLA.†*

Essential Character.

Antennæ four, terminal joints not articulated; *antennæform processes* above the mouth; *caudal styles*, three pairs, peduncle depressed linear, supporting two lanceolate lamellæ.

Natural Character.

Body soft, external covering membranaceous; *head* very short, transverse; *eyes* longitudinal, placed opposite the base of the superior antennæ; *clypeus* projecting into an acute angle; *front* concave; *antennæ* four, unequal, inferiores longest, four jointed, compressed, basal joints very short, third and fourth longer, equal, the latter entire, superiores abbreviated, compressed, triarticulate, basal joints short, robust, concealed by the clypeus, terminal joint not articulated, linear, compressed, obtuse; *mouth* protuberant; *labrum* emarginate, supporting two filiform, triarticulate processes, of which the first joint is very short, second linear, third shorter, subulate; *labium* (pedipalpi) bifid, closing the mouth, laciniae linear, inner edges hirsute, tips

† In allusion to the form of the terminal divisions of the caudal appendices.

rounded; *thorax* oval, convex above and beneath, seven jointed, sutures imbricate; *feet* fourteen, simple, two anterior pairs compressed, terminal joints conic compressed, remaining pairs somewhat cylindric, armed with a minute, subterminal nail, sixth pair much the longest; *vesicular branchiae* oblong, distinct, placed at the inner base of the feet, excepting the first and seventh pairs; *abdomen* abruptly much narrower than the thorax, of three subcylindrical segments, each furnished with natatory feet; *tail* depressed, three jointed, joints furnished each with a lateral style, which consists of a foliaceous linear peduncle, supporting two acute lanceolate, subequal lamellæ, two anterior styles equal, posterior pair rather shorter, terminal segment attenuated between the posterior styles,

SPECIES.

L. *pelagica. *Antennæ*, inferiores more than half as long as the thorax, superiores attaining the middle of the third joint of the inferiores; *antennæform processes* surpassing the second joint of the inferior antennæ; *thorax*, first segment shortest, acutely angled before near the clypeus, second and third segments longest, equal; *feet*, anterior pair shortest, third, fourth, and seventh equal, fifth longer, sixth longer than the thorax.

Length one inch and one fourth

Inhabits—Gulf-stream.

Cabinet of the Academy.

Two specimens of this animal were found by Capt. Hamilton, in the Gulf-stream, and from them, although

both females, the above descriptions are taken; the male not having yet come under examination. I am sensible that it is not perfectly consistent with a due degree of caution, to construct a genus for the female of an animal, when, as in this case, the male may present diverse characters, or such as are much more prominent and accessible, although this has been often done. But in the present instance we have an animal to give an account of, whose generic traits widely differ from those of any other as laid down by naturalists, so that in order to be introduced into this paper at all, it is believed that the formation of a distinct genus is unavoidable; this is therefore offered provisionally, to be altered, rejected, or retained, as the male, when discovered, may justify.

Its generic affinities are rather difficult to determine. It is allied to Amphipoda by the vesicular branchiæ, and by the caudal appendices to the genus *Phronima*, more than to any other of this order; in the external appearance of the mouth there is a great similarity to the Linnæan *Oniscii*, the labium being nearly the same in form. In general form it somewhat resembles *Oniscus cæruleatus* of Montagu, *Trans. Linn. Soc. Lond.* vol. xi, from which I suppose Doct. Leach has formed his genus *Praniza*, which, although but slightly characterized by Mr. Latreille, in *Le Règne Animal*, tom. 3, p. 54, and without any reference to books or specimens, is evidently very distinct.

Observations on the genus GLYCINE, and some of its kindred genera. By Stephen Elliott, of Charleston, S. C. Read June 23, 1818.

In endeavouring to examine, and reform, the characters of plants, an inhabitant of this country feels sensibly the disadvantages under which he labours. There are here no Botanic Gardens, where living plants, collected from different countries and climates, may be collated and compared; no large herbariums, where even specimens may be examined; and no large libraries, devoted to natural history, where figures might sometimes serve to explain and illustrate an obscure or doubtful plant. I shall not, therefore, attempt to arrange all the species which have hitherto been thrown together in the genus *Glycine*, but shall confine myself, in this paper, to those native plants of North America which I have had an opportunity of inspecting.

The genus *Glycine* appears to have served for some time, in the class *Diadelphia*, the same purposes which the genus *Sophora* answered in the class *Decandria*; to have been an ill defined genus, where every plant, (some scarcely kindred species) which did not, by marked characters, belong to other known genera, found a resting place. In this manner the species have increased from two to forty-four, and now present an assemblage of ill associated plants. Many late writers have noticed some of the anomalies of this genus, but none, I believe, has yet attempted a radi-

cal reform. This, therefore, as far as the North American species are concerned, I mean now to propose.

The *Glycine apios* is acknowledged to be the species from which this genus was originally formed; the name is even derived from the sweetness of its leaves and roots. Correctness, therefore, requires that this species shall still be considered as the type of the genus, and that those species only shall be permitted to remain which agree with it in habit and essential character.

An original error crept into the description of this genus, by Linnæus, which has led to many subsequent mistakes; perhaps not knowing the character which most strongly separated it from *Phaseolus*, he was fearful of confounding those two genera, if he ascribed to *Glycine* a spiral carina; he therefore described it as deflecting the vexillum with the point of the carina. Now the *Glycine apios* has really a spiral style and carina, and this character having been given exclusively to *Phaseolus*, some of our species of *Glycine* have been inaccurately transferred to that genus. The real difference between *Phaseolus* and *Glycine*, is discoverable in the fruit, the *Phaseolus* having a flat, falcate legumen, and flat reniform seeds; and the *Glycine* a cylindrical legumen, with seeds cylindrical, and truncate at each end. The *Glycine* thus understood, unites a number of plants very naturally allied, and which exhibit no other differences than those that are strictly specific.*

* Still it may be remarked that the *G. apios*, with pinnate leaves, flowers in a thyrsiform panicle, and a stem climbing to a considerable height; and

The *Glycine tomentosa*, its supposed varieties, and some kindred species, form a tribe of plants very distinct from *Glycine*; they have, in fact, no character in common with that genus, except the one arising from their class; and were placed by Walter perhaps quite as correctly in the genus *Trifolium*, as they were by Linnaeus in their present station. These plants form a very natural family, and are distinguished by small petals, almost straight, and exhibiting but a trace of the papilionaceous structure; legumen scarcely longer than the corolla, compressed, slightly falcate, and in every species, with which I am acquainted, dispernous; seed flat, reniform. Of this genus we have several very distinct species.

There are still some plants connected with this group, which create some embarrassment. If on the one hand it is burdensome, and in many respects disadvantageous, to create a multitude of genera, on the other hand we obstruct and retard the progress of botany itself by uniting in one genus plants of discordant habits, and of varied structure. It is only by investigating and noting the prominent and peculiar characters of plants, that we can hope ultimately to form natural genera; and it is only from natural genera that natural orders can ever be correctly established.

The *Glycine frutescens* is one of the two species originally given to the *Glycine* by Linnaeus, yet it agrees in scarcely any circumstance but habit with the *G. apios*. Its style and carina are simply falcate; its

the *G. angulosa*, &c. with stems trailing or feebly climbing, ternate leaves, and flowers in small clusters, resembling capituli, form sections, which may mark future genera.

vexillum deflected apparently without the influence of the carina ; and its legume, which Linnaeus did not note, nearly cylindrical, and coriaceous. Its legume, however, forms its most important point of resemblance.

The *Glycine monoica* forms another anomalous species ; in habit distinct, in the structure of the corolla resembling some species of *Vicia*, and in its legumes varying from the *Glycine*. Walter, whose accuracy of observation merits more praise than it has yet received, while he was misled by the spiral carina, to place two species of real *Glycine* with the *Phaseolus*, yet perceived the discrepancy between these two plants, and the *G. apios*, and has pointed them out as distinct genera.

A third plant, hitherto I believe undescribed, which grows along the southern coast of Carolina and Georgia, is connected with this group ; but as I wish to compare further, if possible, its affinities with some foreign genera, I shall, for the present, postpone its consideration.

I can readily perceive, that the arrangement I have proposed, will require the removal of many of the existing species of *Phaseolus* and *Glycine*, yet the result I hope, will be, that those which remain in each genus, will be plants which nature, and not man, has chosen to associate. So many corrections and modifications of the genera established by Linnaeus, have been made as the knowledge of plants has become more extensive, that all appear to require frequent revision ; and it may become necessary, in the class we are now examining, to consider the spiral style and

carina as marking a group of genera, rather than as the exclusive character of a single genus.

The following arrangement, therefore, is submitted to the consideration of Botanists.

PHASEOLUS.

Char. Ess.. *Carina cum staminibus styloque spiritaliter tortis. Legumen compressum, falcatum. Semina compressa, reniformia.*

1. *Perennis.* Walt.

P. caule volubili; racemis geminatis, paniculatis, folio longioribus; pedunculis geminatis; bracteis obsoletis; leguminibus pendulis. Willd. sp. pl. 3, p. 4031.

Walt. p. 182. Pursh. 2, p. 469.

P. paniculatus, Mich. 2, p. 60.

Hab. in solis fertilibus. Car. Georg.

2. *Macrostachyus.*

P. caule volubili; racemis simplicibus longissimis; pedunculis sub fasciculatis; foliis subtus villosis.

This plant, for specimens of which I am indebted to the friendship of Mr. John Torrey, of New York, appears to differ materially from our southern species. It is every way more robust, the racemes 12 to 15 inches long, with several flowers from each bud. Leaves thick, (which in the *P. perennis* are membranaceous) and very villous on the under surface. The legumes I have not seen.

GLYCINE.

Char. Ess. *Carina cum staminibus styloque spiraliter tortis. Legumen teres, subbiloculare. Semina cylindrico reniformia.*

*SCANDENTES,

1. *Apios.*

G. foliis impari pinnatis, septenatis, ovato lanceolatis; racemis folio brevioribus; caule volubili. Will. Sp. Pl. 3, p. 1067. Walt. p. 186. Mich. 2, p. 63.

Apios tuberosa, Pursh 2, p. 473.

Hab. in humidis.

**PROSTRATÆ interdum volubiles.

2. *Angulosa.*

G. foliis ternatis, foliolis lateralibus biseptatis, terminali parabolico; pedunculo foliis longiore; floribus capitatis. Willd. Sp. Pl. 3, p. 1056. Muhl. Cat. p. 64.

Phaseolus trilobus, Mich. 2, p. 60. Pursh 2, p. 470.

Hab. in collibus arenosis ad littora maris.

In this plant, as it grows on the sea coast of Carolina, the leaflets are generally angled or obscurely lobed; but I possess specimens, collected on the southern islands of Georgia, and in Florida, by Dr. Baldwin, in which all the leaflets are distinctly three lobed.

3. *Umbellata.* Muhl.

G. foliis ternatis, ovatis, glabris; pedunculis umbellatis, petiolo longioribus, leguminibus linearibus.
Willd. Sp. Pl. 3, p. 1058. Muhl. Cat. p. 64.

Hab. in Pennsylvania.

4. *Helvola.*

G. foliis ternatis, deltoidibus, oblongis; floribus capitatis; vexillis brevibus; alis expansis, maximis.

Phaseolus helvolus, Willd. Sp. Pl. 3, p. 1032.

Hab. in Carolina. Lin. planta adhuc obscura.

5. *Peduncularis.* Muhl. Cat. p. 64.

G. foliis ternatis, oblongo ovatis, deltoidibusque; floribus capitatis; vexillo majusculo, emarginato, alis parvulis; seminibus lanosis.

Phaseolus helvolus, Mich. 2, p. 60. Walt. p. 182.

P. vexillatus, Pursh 2, p. 470.

P. vexillato affinis, at alæ nec difformes.

Hab. in pascuis et umbrosis sub aridis.

The last four species, to which, perhaps, may be added some others, taken from the genus *Phaseolus*, form a group closely allied, perfectly natural, and surely very distinct from the *P. vulgaris*, *multiflorus*, and *perennis*; but, as before remarked, it may not be improper to separate this section from the *G. apios*, and form of it a distinct genus.

(*To be continued.*)

*Essay on the Formation of Rocks, or an Inquiry
into the probable Origin of their present Form and
Structure. By William Maclure.*

(Concluded.)

Scoria is a kind of vitreous scum that floats on the surface of all lavas, and is often ejected, before an eruption, by the elastic fluids, and falls and mixes with the cinders. The presence of Scoria in extinct volcanoes is admitted by most Neptunians as a proof of the action of fire, but its presence is, from the nature of the substance, not of long duration; the rain-water carries it off, and scatters it over the lower places and valleys, where the operation of time reduces it to an excellent rich soil, when it of course loses all marks of volcanic origin.

Time, with the assistance of heat and moisture, decomposes and changes all the distinguishing marks of rocks of Volcanic origin, and recomposes them into the form and structure of rocks of Neptunian origin; but the more frequently rocks of Neptunian origin are decomposed and recomposed, the stronger are the characters of their origin, so that we cannot be deceived by the present appearance of Neptunian rocks, when tracing them up to their original form; but we are liable to mistake rocks that were originally of Volcanic origin before their decomposition, for rocks of the Neptunian, after the change which time and the elements have made in them. It is easy to conceive a large field of Volcanic rocks totally reduced to Neptunian by the

daily operation of the elements; but a field of Neptuni-an rocks cannot be changed into Volcanic but by fire. The productions by fire are partial, violent, and at first strongly marked, but liable to lose their characters by the daily and hourly operations of the elements.

Mud Lava may perhaps be considered as the last efforts of an expiring volcano, when the combustible is nearly burned out, and the immense caverns, whence were ejected the great currents of Lava, come to be filled with water, which gradually decomposing the bottoms and sides turns them into clay and mud.

The application of a sufficient quantity of heat to the water in those caverns, so as to turn it into steam or elastic vapour, may perhaps be the most reasonable manner of accounting for these eruptions, which have from time to time overran whole countries ; but the evidence of their origin must rest either on tradition, or the evidence of our senses ; for when once the circumstance of their being ejected from the bowels of the mountain is forgotten, there is no mark on the mud itself to distinguish it from mud deposited by a river, the sea, or any other aqueous agent.

Cinders are a volcanic production that are ejected in all stages of the eruption, like showers, and fall on the earth in strata of different colours, imitating the stratification of Neptunian rocks, as at Orlet, in Spain; but when thrown out in mass, and like a current, they generally indicate that the volcano is about to finish ; and that the combustible matter is nearly exhausted :

as at St. Vincent, and the other small volcanic islands of the West Indies. These Cinder eruptions throw out large quantities of rocks half roasted, that have all the appearance of primitive rocks ; some like granites, others like gneiss, and some hornblend and feld-spar rocks, neatly crystallized and brilliant, having all the feldspar half vitreous. There is a great similarity, both in structure and appearance, in the roasted rocks, thrown out with the Cinders, in the environs of Rome, and those thrown by different eruptions in the West Indies. When such beds of Cinders have lain long exposed to the weather, the greatest part wash away, and the remainder become earthy and lose most of the characters of volcanic productions.

Pumicestone is of volcanic origin, produced by the interference of a medium that is a good conductor of heat, such as water ; it is generally found on islands ; and attends most submarine eruptions. Most of the Pumice of commerce comes from the islands of Lipari ; it is likewise abundant in the West India islands ; and generally near the sea. The rapid cooling of the melted glass, before the elastic fluids are disengaged, seems to be necessary to the formation of Pumicestone. In an extensive field of volcanic productions at the Cape du Gat, in Spain, the Pumice joins to the Pearlstone and Obsidian, and appears to be the outside, while the Pearlstone and Obsidian occupy the interior, and have been subject to a more gradual cooling. At the Cape du Gat, vast excavations were made by the Romans, in search of gold, according to the opi-

nion of the inhabitants, but really for the alum rock, similar to the alum rock of Tolsa, at Sulfaterra, near Naples, and in all the volcanic islands of the West Indies, formed by the lava, bleached by the sulphuric acid.

The seat of Volcanic fire is not known ; how deep it may originate below the primitive is exceedingly uncertain, or whether its beginning, and progress, is limited to the primitive rocks, and those above them. Experience teaches us that volcanoes are often in the primitive, or at no great distance from it ; and that the greatest part of the substances ejected in a roasted state, and without marks of fusion, are similar to primitive rocks. It is not probable that any new substances have been ejected by volcanoes which were not previously found in some of the other classes of rocks, particularly in the primitive. Sulphur is the combustible substance generally found in and near volcanoes. It is probable that neither sulphur, nor any other combustible substance, has been yet found in the lowest granite ; from which it would appear, that the fire of Volcanoes commences either above or below the mass of granite.

It is probable that two thirds of the volcanoes that we know of are upon islands, many of which have been thrown up from the bottom of the ocean, and consist entirely of volcanic rocks : from which it is probable, that the vicinity of the sea is favourable to the commencement of volcanic combustion.

ORDER II.

Where the fire has not existed within the reach of history, but where the nature and component parts, the relative situation, &c. is little different from the active volcanoes, having the remains of craters, cements, scoria, &c. &c. placed in the same relative situation; the currents of Lava radiating from the crater, and covering all the classes of rocks, and filling up all the inequalities the currents meet with. Between this arrangement, and that of an active volcano, there is a direct and perfect analogy.

In comparing old Lavas with those that have recently been thrown out of a crater, considerable allowance ought to be made for the great change that has taken place in the former by the action of air and water, and the substances that accompany them. The constant filtering of the water, through all the pores of the Lava, takes off its asperity and roughness, while the pores themselves are filled by depositions of the various substances held in solution by the water; at the same time the water oxides the iron in the Lava, and changes it into a dull earthy fracture; all which changes disguise and mask the true character of the rock, and are liable to deceive observation, if it is partial and limited to a small extent of country.

It is the nature of volcanic rocks to be in detached pieces, and particularly after time and decomposition have worn away all the scoria, cinders, porous Lavas, &c. when the most solid part of a current of Lava becomes insulated at a considerable distance from

the other detached masses of rocks of a similar origin. Great care ought to be taken to fill up the chasm that time has made in the continuity of the rocks, before we can decide with propriety.

The fields of extinct volcanoes, that I have had an opportunity of examining, were as similar as possible in their component parts, and relative position: an extensive field round Orlot—near Humila, and at the Cape du Gat in Spain—round Rome—between Rome and Florence, and in the Vincintin, in Italy—in Auvergne, in France—round Andernack on the Rhine—at Cassel in Germany—all of which leave no doubt in my mind of their volcanic origin. In all of them I found abundance of basalt; in some of them the greatest part of the solid Lavas were in form of basalt. The Austrian police prevented me twice from examining Hungary, but I have seen repeated collections of the rocks of that country, and could scarce distinguish them from those collected from around Naples. How the origin of basalt could be doubtful with the Wernerians, can only be accounted for, by Werner having at first put the detached masses of basalt, found in Saxony, into the Neptunian origin, and that his disciples have since persevered in the arrangement.

In geological descriptions, it is probable that much confusion has arisen from mistaking veins for beds. A bed is a stratum in a stratified rock; but rocks that are not stratified cannot be said to contain beds: they may have some of their vertical fissures filled with different substances, or a crack or split in the rock filled up by infiltration, but that I should suppose would be,

properly speaking, a vein. Basalt is not stratified, nor is the greatest part of what the Wernerians call the newest floetz trap stratified; therefore these rocks cannot be said to contain beds, but only fissures, or splits and cracks, filled up with different substances, which can have no relation with the origin of the rock itself.

The volcanic islands of the West Indies, such as Grenada, St. Vincent, St. Lucia, Martiniqua, Dominiqua, Guadaloupe, Montserrat, Nevis, St. Christopher, St. Eustacia, and Saba, have but little basalt exposed to view: and in that resemble active volcanoes, where the cinders, scoria, and other porous rocks, have not had time to wear away, or the rivers to cut canals through their currents of Lava, so as to expose the solid interior Lava to our examination.

In ancient, as in the recent Lava, there is no appearance of metallic veins, or other metalliferous substances; and it indiscriminately covers every class of rocks, not unfrequently even vegetable mould, filling up all the inequalities of the surface over which it runs. This is a strong mark of difference between the Volcanic and Neptunian origin; for the Neptunian being a deposition from water, by the force of gravitation, would form a bed of the same thickness upon the whole surface, and leave the inequalities of the surface the same as before the deposition.

ORDER III.

Where the rocks resemble much volcanic rocks, but are deficient in their relative situations, having no re-

mains of scoria, craters, cinders, &c. &c. but are in scattered and detached masses. Here the analogy is not so direct as in the second order, though nearer it than any of the Neptunian origin. The greatest part of this order is basalt, in detached masses, or long ridges; occupying in general the tops of small hills, having no resemblance or relation to the surrounding strata; and covering indiscriminately all the classes of rocks as well as every species of alluvial; in some places it has even overlaid vegetable mould: in all which characters it agrees with the rocks of recent volcanoes. In its component parts, and imbedded crystals, it is equally resembling, having crystals of peridot, and pyroxine, disseminated in it, like the recent Lavas of Mount Vesuvius. As in the Lavas of recent Volcanoes, so in this order, there are no metallic veins or deposits found; which seems to be a characteristic difference drawn between the two origins, that cannot be mistaken, and perhaps would form a line of separation sufficiently strong of itself without the aid of any other difference.

Pitchstone, greenstone, pearistone, porphyry, eliakstone, &c. &c. are names given to the different kinds of rocks found in what Werner calls his newest *fletz* trap class: they indifferently cover all other classes of rocks and alluvial, and as they are generally found in the vicinity of basalt, they must be considered of the same origin. This kind of porphyry has a petrosiliceous base, with crystals of feldspar, not the dull fractured porphyry, with crystals of quartz and feldspar, which generally covers the primitive, though it

seldom alternates with it. In this way confusion of names takes place. A Neptunian geologist travels over a country, where the rocks of the newest floëtz trap occur: he finds trap, greenstone, and greenstone traps, porphyries, clinkstone, basalt, &c. &c. A Volcanist travels over the same ground, and he describes it as consisting of different species of Lava.

Werner being the first that made any classification of rocks, his disciples of course were the first who made any geological observations; and as they seemed all much interested in putting this class of rocks into the Neptunian origin, they passed slightly over them, and described them by Neptunian names. This may perhaps be one reason why they are not so generally known as other rocks, and why they are to be found in greater abundance on the surface of the earth than was generally supposed. When positive and liberal examination takes the place of that party and systematic spirit, which seems to have no other object in view than the support of a theory purely conjectural, depending on the fancy of the author, and changed and overturned by every new inventor of systems, it is then that the science of geology will make rapid progress, and be ranked according to its real utility.

This class of rocks is scattered over the surface of the globe. I found them in the Crimea; along the south side of the Bohemian mountains; on both sides of the Saxon mountains, but more common on the south side; near the Rhine at Hohenweiler and Old Brisack; scattered over the country of Thuringia and Hessecastle; occupying the tops of the hills through

the greater part of the Vivarais ; at Montpellier and Agde in France ; at Carthagena in Spain ; in patches along the foot of the south side of the Alps, from the valley of Falsa to Lago Majore, &c. &c. On the continent of America, north of the Gulf of Mexico, and east of the Mississippi, none of this formation has yet been found ; the nearest to it is the trap, which covers the oldest red sandstone, but it has no basaltic columns, nor does it contain any peridot or pyroxine ; and in other respects does not much resemble this class of rocks : though this trap approaches nearer to it, than any other yet found. Neither have any active or extinct volcanoes been found in that country, which is a species of proof in favour of common origin ; for if the first and second orders of this class had been found in the United States, and none of the third order, it might have given reason to doubt of their origin ; or if the third order had been found, and the first and second orders of this class were wanting, it would have been equally the cause of doubts ; but absence of all the three orders, implies the absence of fire, the origin of the three orders.

CLASS III.

Containing rocks that have some distant resemblance both to the rocks originating in water, and in fire, but no distinct analogy to either : whose origin must remain in doubt, depending on simple conjecture.

ORDER I.

Those rocks which conjecture might be disposed to place in the rocks of the Neptunian origin.

Gneiss by its extensive and regular stratification agrees with the relative situation of all Neptunian rocks, but it differs widely in the arrangement and nature of its component parts from any rocks known by actual observation to be of Neptunian origin : it equally differs from those rocks placed by direct analogy in the Neptunian class, though it agrees with the Neptunian in having many and rich metallic veins intersecting it. This perhaps is one of the most prominent marks of distinction between the two origins of fire, and water.

Mica Slate being a species of gneiss, where the layers of feldspar or quartz are so small as not to be distinguished by the eye, must of course follow the origin of the gneiss, as it frequently runs by imperceptible gradations into gneiss, and gneiss into mica slate, making it difficult to decide where the one begins, or the other ends.

Primitive Limestone frequently alternates with gneiss, and resembles the Neptunian origin in its regular and extensive stratification. It does not differ much in its structure from other limestone formed by water, such as the stalactites in caves. It therefore

is nearer the rocks of undisputed Neptunian origin than the gneiss; and perhaps only differs in the total absence of the remains of organic matter, with which the limestones of Neptunian origin are filled.

Clay Slate is a rock which corresponds with the rocks of Neptunian origin, in its mode and regularity of stratification: it does not differ very much in its structure and external appearance from the Clay Slate of transition. It having no remains of organic matter in it, while the slates of undisputed Neptunian origin contain both vegetable and animal remains, prevents the analogy from being direct, and leaves it in doubt.

Serpentine has a regular, and rather extensive stratification, similar to the rocks of Neptunian origin; but in its structure or external appearance, it does not agree with any. It is likewise without the remains of any organic matter, which prevents it being classed by direct analogy with the Neptunian, and leaves it in doubt.

It would appear that Serpentine is more liable than any other rock, to change its form and external character, by the agency of the common elements of rain, &c. &c. and in many instances the changes are visible, where it appears to be sheltered from the weather, as its mutation into every species of asbestos, amianthus, and all the variety of fibrous rocks of the magnesian class. At a place called Bauldissere, at the

foot of the Alps, about twelve or fifteen leagues from Turin, a dark coloured Serpentine is gradually changing into a carbonate of magnesia; which may be traced through its progress at every step, from the beginning to the end of the process; and there is no visible agent, as great part of the rock is evidently below the influence of the weather. Perhaps some new light might be thrown upon some of nature's agents by a close examination of such changes.

When geological researches are partial, and confined to a small portion of the surface, it is probable that sufficient allowance is not always made for that slow and imperceptible change, which takes place in the structure and external appearance of the rocks, without the aid of any of the known agents, but by a process as yet unknown; not having come within the sphere of our observations we are ignorant of the mode which nature takes to produce such changes.

ORDER II.

Containing those rocks which analogy might be disposed to place in the Volcanic origin.

Hornblend rocks, both greenstones and sienites, as well as the unmixed Hornblends, resemble some species of lava, nearer than they resemble any rock of undisputed Neptunian origin; but in their relative positions, and regularity of extensive stratification, they are similar to those of the Neptunian origin, as well as in having pyrites, and other metallic substances, dissc-

minated : for this reason the analogy is not direct, and the origin must remain doubtful.

Porphyry, in its structure and external appearance, resembles much some lavas, more particularly those of the oldest kind, where the asperity has been worn off, and softened by time : but in its mode of stratification and relative situation, it is similar to the Neptunian origin, therefore the analogy is not direct and the origin must remain doubtful.

Granite. There are two species of Granite ; the one in large grains, which occasionally alternates with gneiss, and contains many of the valuable specimens of minerals, such as the emerald, cymophane, tourmaline, &c. &c.; and the other, a middling grained Granite, often with much quartz in it, occurring under all other rocks, in large fields, without any well defined stratification, but divided often by vertical fissures. This last is the Granite of which we are speaking ; it has more resemblance to some of the feldspathic lavas, than it has to any rock known to be of Neptunian origin. It likewise approaches the volcanic, in relative situation, without any regular stratification. Yet the resemblance does not appear sufficiently strong to amount to direct analogy, and we must therefore remain in doubt as to the nature of its origin. This Granite is the lowest rock in the arrangement of the globe; through which we have never penetrated; and beyond which we know nothing. Is it the nucleus of the earth, from which, and on which, all changes and formations

emanate and rest, as an eternal foundation? or is it only a link of those changes, the circle and recurrence of whose action is lost in the immensity of time? We know nothing; we may form theories and systems without end, and perhaps one system is as good as another; but still we must recur to the humiliating truth, we know nothing.

Between the rocks of the third class, called primitive, and the rocks of the first class of positive Neptunian origin, the great line of distinction is the abundance of remains of animals and vegetables in the first class, and the total absence of them in the third class: this third class is similar to the second class or volcanic origin, in being without any remains of organic matter.

The first and third classes differ from the second class or volcanic, by being intersected by metallic veins, and repositories of metallic substances; whereas the second class has no metallic veins, or any metallic deposits in it. The lowest granite approaches to the volcanic in being without metallic veins, or metallic deposits.

The result of this investigation would appear to be, that all the rocks called alluvial, secondary, and transition, are of Neptunian origin; either by the evidence of our senses, or by a strict and direct analogy with those formed daily under our eyes. That another species of rocks which cover and overlay the former, whose origin is either strikingly evident to our senses by the eruptions of active volcanoes, or by a strict and direct analogy, are evidently of volcanic origin, though

the fire which was the agent of these changes may have been long extinct. Having thus narrowed the ground, we come to the third class or primitive rocks, concerning whose origin neither the evidence of our senses, nor direct analogy, will aid our researches; and we are left to the wide field of imagination, where any individual has a right to exercise his talents in forming theories, or in other words in making suppositions. The field of fancy is undoubtedly very extensive, where it is not limited by some reference to facts on which theories may be founded; we accordingly find great variety in the methods different authors have taken to form the earth.

At present, the dispute seems to rest between two antagonists, the disciples of water, and those of fire; called Neptunians, and Plutonists or Volcanists. They both stand their theories upon the same general supposition; that is, that the earth at the time they begin their formation was in a fluid state; but they differ in the agent that nature may have employed to produce that state of fluidity. The Neptunians assert that the whole earth was dissolved in water, and the Volcanists that it was melted into the fluid state by fire. These two theories, as objects of discussion to exercise the talents and imaginations of the literary world, would be innocent and harmless. But when we consider that nine tenths of geological observations have been collected with a view to support one or other of the theories, and of course vary more or less from the true state in which nature placed the substances examined,—and this for the purpose of proving the truth of one

theory, and showing the fallacy of the other—the injury done to science, and the obstructions thrown in the way of its progress are incalculable: for besides the disadvantage of having nothing to work upon but facts, distorted by the jaundiced eye of system, the science itself suffers discredit in the opinion of those who have no practical knowledge of its utility.

While treatises on geology consisted of theories of the formation of the earth, the public had a right to consider geology as a speculation, whose utility, if any, was distant and uncertain; by which means the science of all others the most capable of useful and practical application to most of the operations of common life, was devoted to theoretical disquisitions on the origin and formation of the earth; the utility whereof is very problematical, even admitting the possibility of arriving at any satisfactory result.

From all I have seen, or heard, the primitive is the prevailing rock towards the poles; that is, the primitive in the vicinity of the polar regions, is not covered by either alluvial, secondary or transition; and that there is in those regions a scarcity, if not a total absence, of all the classes of rocks, which contain the remains of vegetable or animal productions; the deficiency of heat may be the cause of this scarcity of animal and vegetable matter.

Should the above observations be confirmed by future experience, it will become probable that the earth's diameter at the poles, has been diminishing, and will continue to diminish, by the gradual wearing away of the

solid rocks, constantly acted upon by the elements : while the earth's diameter at the equator, will be constantly increasing, by the addition of the produce of the consolidating labours of the madrepores, corals, shells, and fish, &c. in the sea ; joined to the production of animal and vegetable matter on shore. Should this be the case, which at present appears probable, it might account for the earth being flattened at the poles, without the trouble of dissolving it in water, or melting it by fire.

It may be that a great many of the circles of action on which the phenomena of nature depend, have not completed their revolutions, in the comparatively short space of time wherein exact science has regulated and directed accurate observation ; we of course remain ignorant of the laws that governed nature, as well as of the agents employed by her, in accomplishing her designs. But we have a right to conjecture, from all we know of the order and undeviating regularity of her laws, that those we do not know, will be equally certain, and unerring, in their operations, by slow and gradual means to effect her purpose ; nor indeed have we any right to suppose an order of things totally subversive of all the laws of nature, with which our experience has brought us acquainted.

In accounting for the phenomena of nature, we ought, perhaps, to limit ourselves to the operation of such laws as experience has made us acquainted with ; and when these are insufficient, we might suppose that there are some modes of operating, some agents that

nature employs, with the qualities of which we are still unacquainted; and so go to work to examine accurately nature's works, as the only certain mode of becoming acquainted with her laws:—this method would, at least, save much precious time both to writers and readers.

An Account of the FLORIDA JAY, of Bartram. By George Ord. Read May 26, 1818.

In William Bartram's travels a Jay is mentioned as inhabiting East Florida; but this notice is unaccompanied with a particular description. Hence succeeding naturalists were in doubt whether to regard it as a new species or not. In Latham's second supplement, page 111, it is referred to the *Corvus Stelleri*, but this is represented as crested, and the former is not. Recently Monsieur Vieillot, in the *Nouveau Dictionnaire D'Histoire Naturelle*, tome XII, recorded Bartram's Jay under the name of *Le Geai azurin*, and described another which he himself discovered in Kentucky. Perhaps, says this author, it is the young, or the female, of the *Geai azurin*, which is also found in the same country. We take this mode of informing the ingenious French naturalist, whose labours have contributed so much to the enlargement of our knowledge of American Ornithology, that these birds are one and the same species. During the months of February and March

last, we had an opportunity of examining several specimens, which we procured in the vicinity of St. Augustine, and near the mouth of the river St. Juan, in East Florida, from the most perfect of which the following description was taken.

Genus GARRULUS, BRISS.

Bill of a middling size, furnished at the base with setaceous feathers directed forward, thick, stout, bent, cultrate; *upper mandible* with an obsolete notch towards the end, and deflected suddenly at the tip; *nose-* *trils* almost oval, open, or covered by the feathers of the *capistrum*; *tongue* cartilaginous, flattish, bifid at the tip; *wings* of a middling size, *spurieus* wing short, rounded at its extremity; *toes* four, three forward, one backward, the exteriors united at their base *. *Vieill.*

GARRULUS cærulescens.

Corvus Floridanus, pica glandaria minor, the Little Jay of Florida, BARtram's travels, p. 290. Le Geai azurin, *Garrulus cyaneus*, VIEILL. Nou. Dict. Hist. Nat. tom. xii, p. 476. Le Geai gris-bleu, *G. cærulescens*, id. p. 480.

Head, neck, wings, and tail bright azure; *back* *broccili-brown*, inclining to hair-brown; *lower parts* dark yellowish gray; *tail* subcuneiform.

Bill, legs, and claws, black; *irides* hazel-brown;

* Vieillot adds to his characters the following: "The three first remiges *æguis*, the fourth and fifth the longest." In the specimen described above, I observed that the third and fourth remiges were the longest, of course the characters are not constant.

front, and line over the eyes, pale azure; *lores, cheeks,* and *crown* with some black intermixed; *throat* paler than the abdomen, and faintly streaked with ash; the blue from the cheeks passes down along the breast, forming an obscure crescent; inner webs of the *remiges* dusky; the *tail* is nearly six inches long, composed of twelve feathers, the upper feather darkest, part of the inner vanes of the under feathers dusky; *length* eleven inches and three quarters, *breadth* fourteen inches and a half. Male and female much alike.

When we first entered East Florida, which was in the beginning of February, we saw none of these birds; and the first that we noticed were in the vicinity of St. Augustine, on the thirteenth of the above-mentioned month. We afterwards observed them daily, in the thickets, near the mouth of the St. Juan. Hence we conjectured that the species is partially migratory. Their voice is not so agreeable as is that of the *G. cristatus* or Crested Blue Jay of the United States; they are quarrelsome, active, and noisy; and construct their nests in thickets. Their eggs I have not seen.

The Blue Jay, which is so conspicuous an ornament to the groves and forests of the United States, is also common in Florida. This beautiful and sprightly bird we observed daily, in company with the Mockingbird, and the Cardinal Grosbeak, around the rude habitations of the disheartened inhabitants, as if willing to console them amid those privations which the frequent Indian wars, and the various revolutions, which their Province has experienced, have compelled them to bear.

Descriptions of several species of North American AMPHIBIA, accompanied with observations. By Jacob Green, M.D. of Princeton, N. J. Read May 12, 1818.

ORDER II.

SAURIAN REPTILES.

Genus LACERTA.

Note. Daudin has subdivided this genus into seven sections; but as I think this mode leads to uncertainty in arranging the animals, I have not adopted it.

LACERTA quinque-lineata, var. *Cauda longiuscula*, *squamis oviformibus*, *corpore lineis quinque cæruleis*.

Striped L. Whole length between five and six inches; tail longer than the body, tapering, cylindrical, slender, and pointed; ear hole oval; scales above and beneath oval; back dark chesnut-brown, marked with five longitudinal light blue lines, the central one commences at the snout, which is pointed, divides between the eyes, unites again over the throat, and continues to the end of the tail; beneath whitish, and streaked; feet five-toed, clawed.

Note. The above very much resembles the *L. quinque-lineata* of Carolina, mentioned in the books, dif-

ferring in little else than the colour of the stripes, which in the Carolina species are yellow.

L. hyacinthina. Cauda longiuscula, squamis abdominis ovatis, cæteris acutis, corpore lateribus cæruleis seu hyacinthinis.

Indigo L. Length about six inches; *tail* rather longer than the body, tapering, and rounded; *back* light azure, bordered with dirty brown; *sides* of a bright indigo—this colour is in the form of a stripe, which begins under the angles of the mouth, and extends to the posterior legs; *beneath* whitish; *scales* on the back acuminate, the others oval; *snout* obtuse.

Note. The blue stripe on the sides of this lizard appears dark brown or chesnut by candle-light.

L. fasciata. Cauda longiuscula, squamis abdominis ovatis, cæteris acutis, fasciis transversis nigris et albis.

Banded L. Length five inches; *tail* rather longer than the body, tapering, cylindrical, and terminating in a blunt point; the *back* and *tail* brownish, marked with transverse, waving bands, of black and white; *beneath* dirty white; *scales* of the back acuminate, the rest oval: these scales are in rows, forming longitudinal streaks; *snout* obtuse; *chin* a little pouched.

ORDÉR III.

BATRACIAN REPTILES.

Second Family. TAILED BATRACIANS.

Genus SALAMANDRA.

SALAMANDRA maculata. *Cauda mediocri, corpore supra albido, ocellis subrotundis ferrugineis, subtus albido.*

Brown-spotted Salamander. Length four or five inches; tail about as long as the body, tapering, slightly compressed, and pointed; snout rounded; back whitish, sprinkled with irregular, reddish-brown spots; beneath white; anterior feet four-toed, posterior feet five-toed.

Note. Individuals of this species vary much in size, and in the number of spots. I have one about three inches long, with the tail more compressed, and obtuse, than the above.

S. fasciata. *Cauda mediocri, corpore supra ferrugineo, fasciis transversis subcæruleis, subtus cinereo.*

Banded S. Length between four and five inches; tail about as long as the body, oval, tapering, and pointed; snout rounded; back brown, marked with transverse, irregular blue bands; upper part of the tail brown, marked with light yellow spots; beneath ash colour; anterior feet four-toed, posterior five-toed.

Note. When young, the under part of the body is of a dark brown hue, at least this is the case in my specimens.

S. subfusca. Cauda brevi, corpore subfuscō nigra maculato, subtus luteolo.

Olive-brown S. Length six inches; *tail* rather shorter than the body, tapering, slightly compressed, and pointed; *snout* rather oval; *back* of an olive-brown hue, marked with dark spots; *beneath* yellowish, and spotted; anterior *feet* four-toed, posterior five-toed.

Note. The colour of the above very much resembles that of the common Water Newt of England. I have two varieties of the above; the spots on the back of one are more distinctly marked than on the other, and it wants the spots beneath; this difference is, I think, owing to age. In the other, which is evidently an aged animal, the distinguishing marks pretty nearly agree with the first, but the whole is of a darker hue. It inhabits shallow waters.

S. longicauda. Cauda longa, corpore supra nigra maculato, subtus albido.

Long-tailed S. Length between five and six inches; *tail* almost twice as long as the body, tapering, compressed, and pointed; upper side of the *limbs*, *tail*, and *back*, spotted; *beneath* whitish; anterior *feet* four-toed, posterior five-toed; *snout* rounded; *eyes* protuberant; whole animal slender.

Note. Taken in marshy places, in the state of New Jersey.

S. nigra. Cauda mediccri, corpore supra nigricante, subtus albido, lateribus albido punctatis.

Black S. Length about four inches; *tail* of the length of the body, tapering, oval, and pointed; *snout* oval; *eyes* black, prominent, and approximate; *back* blackish; *sides* sprinkled with small white spots; *beneath* whitish; anterior *feet* four-toed, posterior *feet* five-toed.

Note. Inhabits shallow waters. This differs from Daudin's *La S. noire*, that being uniformly black.

S. bislineata. Cauda longiuscula, corpore supra cinereo lineis variorum colorum distinctis, subtus albido seu luteolo.

Two-lined S. Length about three inches; *tail* longer than the body, tapering, compressed, and pointed; *snout* oval; *back* cinereous, with two, and sometimes three, dark lines, if three, the middle one broadest near the head, and about the length of the body, the lateral ones extending from behind the eyes to the end of the tail; *sides* cinereous; *beneath* whitish or yellowish; anterior *feet* four-toed, posterior five-toed.

Note. Inhabits shallow waters; is found in numbers early in the spring, and is very active.

S. sinciput-albida. Cauda brevi, corpore supra ferrugineo, subtus luteolo.

White-nosed S. Length about three inches; *tail* shorter than the body, thick, tapering, and pointed; *snout* oval, white above; *eyes* protuberant; *back* dirty

ferruginous; beneath yellowish; anterior feet four-toed, posterior five-toed,

Note. Found in Newjersey, and said to inhabit shallow waters.

S. rubriventris. *Cauda brevi, corpore supra fusco nigroque variato, subtus rubro seu aureo.*

Red S. Length between six and seven inches; tail shorter than the body, slightly tapering, compressed, and pointed; skin slimy; back blackish, with brown spots; sides red; beneath red; eyes protuberant; snout rounded; anterior feet four-toed, posterior five-toed.

Note. This I think is only a variety of *La. S. ventre orangé* of Daudin, a description and figure of which he has given in his vol. 8, p. 239, pl. 98, fig. 1. Inhabits shallow waters.

Observations. Little is known respecting the hibernation of Salamanders. On the approach of winter they seek some retreat, which protects them alike from their enemies, and from the sudden changes of the weather; here they remain till the spring returns; and even after they have left their winter residence, a moderate degree of cold produces inactivity, listlessness and lethargy. At such seasons I have searched for them in vain in places where but a few days before they were to be found in numbers. About the beginning of March, if the season is favourable, the *Salamandra rubriventris*, var. makes its appearance in the neighbourhood of Princeton, in shallow streams, where it lies concealed beneath stones, and under

old logs, which have fallen in the water. If they are found in marshy places, upon removing the stone, or log, which conceals them, they show but little inclination to stir, and seem as if just aroused from sleep; but in shallow water they are more active on being discovered. I confined a number of these in a box, prepared for the purpose, wherein was a shallow vessel of water, surrounded with earth, forming a little standing pool; and in this situation I observed them attentively for some weeks. I have no doubt they are nocturnal animals, leaving their retreats in search of food during the night. This seems the most appropriate time for the purpose, for then their food, which is principally small worms, is most easily obtained. Besides, they are the prey of the small American Bittern, and if they wandered about during daylight they would be almost exterminated by their voracious foe, who even when in their retreats devours many, and mutilates great numbers of them. At all events, those I had confined rarely left the water during the daytime, and were generally out of it during the night. The eyes of most of the *Genus Salamandra* are very prominent, so as to enable them to discover objects in every direction around them; but as a prominent eye would be very liable to injury, when under stones, and other places of refuge, the animals have the power of withdrawing it entirely into the head. I observed in those confined, that when under the water the eye remained imbedded in the socket, but as soon as the head was elevated above the surface it was projected. Whether by this motion of the eye

the animal alters the form of the crystalline lens, so as to discern objects under the water, as well as in the air, I am not able to state; but I have little doubt that such is the fact. The pupil of the eye of this animal, as well as in all the other water Salamanders which I have examined, is horizontal, as in the horse; and I think it has not the power of dilation, or expansion, this faculty being compensated by the power of withdrawing the eye as before mentioned. This particular shape of the pupil is beautifully adapted to an inhabitant of shallow water, enabling it to take an extensive view from side to side; there being little occasion to look upwards. I have reason to believe that the larvæ or young of these animals appear very soon after the animals themselves leave their brumal retreats, for what I conceive to be the young, with gills, I have observed sticking to stones in the water; and I have caught them an inch long, the gills having disappeared. It is a well known fact that torpidity, instead of exhausting the energies of nature, increases its vigour. The colour of these animals varies considerably by reason of age: in those about three inches long, the red predominates, so as to make them appear almost another species—in those about four inches long the blackish spots are larger, and more numerous—and in the full-grown animal the colour appears as described in the specific character.

LAND SALAMANDERS.

S. erythronota. *Cauda brevi, corpore supra fusco rubroque variato, subtus cinereo.*

Red-backed S. Length between three and four inches; *tail* rather shorter than the body, tapering, cylindrical, and pointed; *snout* obtuse; *eyes* prominent and black; *back* red, mixed with brown, the colours form a stripe from the snout to the end of the tail; *below* cinereous; *throat* whitish, with a few dots of crimson near the neck; anterior *feet* four-toed, posterior five-toed.

Note. The young of this species have no brown mixed with the red on the back. I have given Mr. Rafinesque's name of a species found in rocky situations in Newyork to this, believing them to be only varieties. This animal is not very rare in Newjersey. It is found under stones, in high places.

S. cinerea. *Cauda longiuscula, corpore supra fusco, albo maculato, subtus nigro albo distincto.*

Dapple S. Length about four inches; *tail* longer than the body, tapering, cylindrical, and pointed; *head* large; *upper parts* bluish; *snout* obtuse; *back* dark brown, sprinkled with small white dots; *below* black and white mixed; *throat* whitish; *eyes* large and prominent, pupil round and black, iris yellowish brown; anterior *feet* three-toed, with a small thumb, posterior four-toed, with a small thumb.

Note. This is quite common in New Jersey; it is found under stones, in rocky situations, from one to four inches long. A milky fluid issues from the pores of the body, when the animal is plunged in spirits.

S. glutinosa. *Cauda longa, corpore supra nigra,*
albo maculato, subtus nigro.

Glutinous S. Length six inches; *tail* nearly twice as long as the body, tapering and pointed, near the end slightly compressed; *snout* obtuse; *eyes* prominent and dark brown; *back* blackish, marked with white spots, composed of small dots; *beneath* black; *anterior feet* four-toed, *posterior* five-toed.

Note. Found under stones, in elevated situations. A glutinous fluid exudes from the pores of the skin; this fact is only uncommon as to the quantity.

S. fusca. *Cauda mediocri, corpore supra fusco,*
subtus albo, lineis duabus punctis, nigris inter-
spersis.

Brown S. Length about three inches; *tail* length of the body, tapering and slightly compressed; *snout* obtuse; *eyes* not remarkably prominent; *back* uniformly of a yellowish brown colour; *beneath* white, with a line, on each side, of black spots; *throat* spotted with black; *anterior feet* four-toed, *posterior* five-toed.

Note. I know not whether this is a land or water animal; it was found under a rail in a moist place, some distance from a stream. The tail, which was accidentally separated from the body, preserved a vibratory motion for some time. This motion of the

tail, when amputated, is I believe common to all Salamanders, and indeed to most reptiles.

Genus PROTEUS.

PROTEUS *Neo Cæsariensis.* *Cauda mediocri et compressa forma pinnæ, corpore albido.*

Newjersey Proteus. Length between four and five inches; tail as long as the body, tapering and forming a fin; snout obtuse; tongue short, round, adhering to the lower jaw, and having a cartilaginous edge; branchiæ persistent; eyes very small; nostrils invisible; back dirty white, with small dots, margined with a narrow red line, commencing at the fore shoulder, and terminating at the posterior legs; beneath whitish; posterior feet five-toed, anterior four-toed.

Observations. This is the only species known in America. There are but three yet described in the books, the *P. anguinus*, *P. Mexicanus*, and *P. tetradactylus*.

I have another animal which resembles the Proteus, inasmuch as it is furnished with a fin tail, and gills, but I will not be positive that it is a new species. If it is only the larva of a species of Salamander, it must belong to a much larger species of that genus than I have yet seen in this neighbourhood; the following is a description of it: Length about three inches; tail as long as the body, tapering, and in the form of a fin; snout oval; eyes very small; nostrils invisible; neck

with gills; *back* black and white, confusedly mixed; *beneath* whitish; anterior *feet* four-toed, posterior five-toed, toes cloven to the base.

Descriptions of several New species of North American Fishes. By C. A. Le Sueur. Read March 3, 1818.

(Continued from page 235.)

Genus MEGALOPS. La Cépède.

Fishes of this genus are Herrings, properly so called, in which the last ray of the dorsal-fin is prolonged into a filament. Some have their snout projecting beyond the jaws; but the form of the latter distinguishes them always from Anchovies. Cuvier, Règne Animal.

1. *Megalops oglina.* *Dorsal-fin* as high as long at its base, its last ray prolonged as far as the tail; *back* with three longitudinal black bands on each side; *eyes* situate midway between the end of the snout, and the posterior part of the *opercula*, which is narrow, perpendicular, and slightly rounded; *pectorals* very small; *anal-fin* long, very narrow, almost concealed by the scales which cover its base. This species, which one might confound with the *Clupea thrissa* of Bloch, pl. 404, differs in its *opercula*, which are straight, narrow, and slightly rounded behind; and

above all by its *anal-fin*, which is hardly visible, whereas in Blech's *thrissa* this last is very large.

The length of its body is six times that of its head, its depth about a head and a half; *back* almost straight; *throat* and *abdomen* describing an inverted arch as far as the tail, and armed with from thirty-two to thirty-three serratures, of which fourteen or fifteen are placed between the ventrals and anal-fin; *head* small, narrow; *eyes* round, irides blackish above, yellow and silvery below; *maxillaries* not passing beyond the fore part of the eyes; *teeth* none; *dorsal-fin* elevated before, very low behind, not emarginated, but almost straight; *pectorals* not projecting beyond the base of the dorsal-fin; *ventrals* small, triangular, situated almost beneath the middle of the dorsal-fin, and midway between the pectorals and anal-fin; *caudal-fin* greatly forked, lobes narrow, pointed, black at their extremities; *back* of a blue colour, with blackish longitudinal bands; *sides* paler; *abdomen*, *throat*, *pectoral*, *ventral*, and *anal* fins white; *opercula*, *head*, *dorsal-fin*, *tail*, and *caudal-fin* tinted with yellow; *opercula* ornamented with rosaceous tints; *scales* large, regular, narrow over the whole body, and at the base of the rays of the caudal-fin; *lateral-line* hardly visible; length of specimen described, eight inches.

To this species is given, as well as to several other fishes, the name of Alewife. Taken at Newport, Rhode-island.

B. 9.—D. 18.—P. 19.—V. 9.—A. 20 to 22.—C. 28 rays.

2. *M. notata*. This species, which I observed at Guadalupe, has some resemblance to the preceding in its narrow opercula, but it is principally distinguished by the following characters :

Its *dorsal-fin* is longer than high, and terminated by a shorter posterior ray than in the foregoing, which ray does not pass beyond the centre of the interval comprehended between this fin and the base of the *caudal-fin*; *sides* not striped; *opercula oblique*.

Back almost straight; *thorax* and *abdomen* arcuated, carinated; body six times the length of the head, in depth about a head and a half; *maxillaries* prolonged under the eyes; *anal-fin* narrow, equal throughout; more apparent than in the preceding, but much less so than in the *C. thrissa* of Bloch; *ventrals* small, truncated; *scales* large; *back* blue, without blackish bands, but ornamented with fine blue spots; *sides* of a pale blue colour; *abdomen* and *head* white; total length of individual from six to eight inches.

The individual above described was taken in a seine, with several other species of different genera, at a village named Pigeon, situate on the seaside, in the island of Guadalupe. I was only allowed a few moments to sketch and examine it, as I was at the point of departure for Basseterre. I cannot find it described in any author to which I have access.

B. 9.—D. 18.—P. —V.—A. —C. rays.

3. *M. Cepediana*. *Body* subelliptical; *tail* narrow; *snout* short, rounded, semigelatinous; *dorsal-fin*

painted, in some lunate, in others slightly rounded, higher than long at its base; *anal-fin* long, its anterior part largest; *opercula* large, rounded, with a slight depression on their posterior part.

The *body* of this species differs from the foregoing in its form: it is short and deep, its length being more than five times that of the head, and its depth about a head and three quarters; the *back* is greatly elevated, almost sharp, having a line, unfurnished with scales, which extends from the nape as far as the base of the dorsal-fin; *abdomen* hanging very low, or very much arcuated, carinated, and armed with twenty-nine spines; *head* short; *mouth* very small; *intermaxillaries* large; *maxillaries* very narrow, not passing beyond the eyes; *mandibles* large, forming an angle within the mouth; *teeth* none; the extremity of the *pectorals* passing beyond the anterior part of the base of the *ventrals*, which are situate somewhat before the dorsal-fin; *caudal-fin* of considerable extent, but not so forked as in the foregoing species; length of specimens examined from eight to twelve inches; colour of the *back* a grayish blue, pale silver on the *sides*, *head* of a burnt terra de sienna, mixed with golden; *throat* and *abdomen* white; extremity of the *ventrals* black, the remainder of the fins tinted with gray-blue, yellow and green, blackish at their extremities; *eyes* small, irides brownish yellow, pupil black; *scales* very narrow, and crowded.

B. 7.—D. 15.—P. 48.—V. 8.—A. 33.—C. 19½.
inys.

This species comes occasionally to the markets of Baltimore and Philadelphia.

Among those abdominal fishes which one meets with in North America, there are several known under the popular name of Herring, which inhabit the river Ohio and Lake Erie. They have, in effect, much resemblance to Clupeæ, in their colour, their large eyes, their large scales, and the compressed form of their body; and with which genus they may be confounded on a superficial view; but it is easy to distinguish them by the absence of the carinated abdomen; by their extremely short intermaxillaries and maxillaries, which are articulated together; and by every part of the mouth being strongly toothed, as in the Salmen family of Cuvier. They have, in a great measure, the habitudes of these last, as like them they appear to prey on living animals, particularly insects, which they take on the surface of the water. The stomachs of several of these fishes, which I examined, in the month of May, 1816, were filled with Scarabei, and the larvæ of *Ephemera*, the perfect insects of the latter, at that period, being observed, in immense multitudes, swarming over the surface of the Ohio.

The want of an adipose fin in our fishes, excludes them from the genus *Salmo*. By their teeth they seem to approximate to the genera *Chirocentrus*, and *Erythrinus*, of Cuvier and Gronovius, and the *Amia* of La Cepède; but they differ from the first by the

vomer furnished with teeth, from the second also by the teeth, and from the third by the pectorals, the dorsal, the teeth, the gill-covers, &c. The characters of the above named genera not conforming to those of our species, I have thought myself under the necessity of erecting a new genus, which I respectfully submit, under the name of HIODON, which may be placed among the foregoing, or between the genera *Salmo* and *Clupea*. Of this new genus I have observed two species.

Genus HIODON.

Characters.

Body as in the genus *Clupea*, but without carinated abdomen.

Tongue supplied by the os hyoides, which is furnished with strong teeth,

Dorsal fin one,

Eyes very large.

Body compressed; as in the Herrings, but without abdominal serratures.

Head narrow; snout very short, obtuse, without scales; nape covered on each side with large triangular scales; posterior suborbita covering the cheeks, anterior ones concealing the maxillaries; praoperulum large, triangular, curving under the throat, its posterior angle rounded, covering almost the whole of the suboperculum; the inter-

perculum very small, squamiform, operculum large, rounded, having a notch on its upper part.

Eyes very large, situated near the end of the snout, and nearly occupying the space between the summit of the head, and the angle of the mouth: they are furnished with a gelatinous nictitating membrane, which extends on a part of the operculum.

Nostrils double, placed at the end of the snout, above and near the antimaxillaries.

Mouth of a middling size, jaws subequal; intermaxillaries short, articulated with the maxillaries, both very narrow.

Teeth conic, equal, close-set, in a single row on the maxillaries, and intermaxillaries, stronger, and in several rows, on the lower jaw, very fine on the palate, the vomer equally furnished with several ranges of very strong ones, on its whole length.

Tongue supplied by the os hyoides, which is armed with two principal rows of very strong, bent, conic teeth, between which there are several rows of very small teeth.

Branchiostegous rays short, superior ones enlarged at their extremities, of the number of 8 or 9; branchial arch furnished on each side, anteriorly, with denticulations, which interlock one with the other.

Air-bladder long, compressed; one observes two other

small subglobular air vessels, placed each in a cavity, under, and on each side of, the cavity of the cranium.*

Fins: a single dorsal, placed opposite to the commencement of the anal; pectorals placed low, near the opercula, ventrals midway between the pectorals and anal.

Scales large, pellucid at the edges, easily deciduous.

SPECIES.

1. *Hiodon tergisus.* *Anal-fin* large, and rounded on its anterior part, very narrow on its posterior part, notched in the middle.

Body lengthened, elevated, back almost straight, and parallel with the abdomen; *tail* narrow; *dorsal-fin* subquadangular, elevated on its anterior part, the three first rays simple, the last double, the intermediate ones divided; *pectorals* falciform, pointed, placed horizontally in a longitudinal depression; *ventrals* large, somewhat rounded at their points, and furnished with a squamiform appendix at their base; *anal-fin* long, with pretty strong divided rays, the last double, the three first simple; *caudal-fin* forked, lobes pointed, equal; *lateral-line* slightly arched towards the back.

This species I observed in Lake Erie, at Buffalo; and Mr. T. Say examined an individual of the same on the Ohio, at Pittsburg. The colour of its *gill-covers* is

* These two small air vessels appear to enable the fish to rise with facility to the surface of the water, to take its prey. Time did not permit me to observe whether there is a communication between them and the air-bladder.

golden, its *eyes* are brown and golden; its *back* is bluish; and its *sides* silvery; its *fins* tinted with yellow, with metallic reflections on the rays. The length of the individual described was thirteen inches. This species is accounted pretty good food; but I do not know whether it is the object of a particular fishery or not.

P. 18.—D. 15.—A. 32.—V. 7.—C. 18 $\frac{1}{2}$ rays.

2. *H. clodus*. *Anal-fin* straight, anterior part large and pointed, without a notch.

The *body*, as in the preceding, much compressed, the back a little more elevated towards the dorsal-fin; the *snout* is likewise rounded, but shorter than in the foregoing; *fins* much as in the preceding, with the exception of the anal, which forms the distinction, noted in the specific character; *lateral-line* rather straighter; rays of both species with brilliant metallic reflections, as in Herrings; colour of both the same. The specimen described was taken at Pittsburg; it was eleven inches long. It appears in abundance in the month of May; its flesh is good.

P. 18.—D. 15.—A. 30.—V. 7.—C. 20 rays.

It will be perceived that the above fishes resemble each other, the principal difference lying in the anal-fin. It may be that they form but one species, and that the individuals described were of different sexes. This point I had not an opportunity of settling by an examination of the sexual organs, as my stay at the places where they are found was very short, and I was

enabled to procure but two solitary individuals. This notice is given with the view of inciting the attention of those naturalists who may have better opportunities of examination than I had.

PLATE XIV.

Fig. 1, *H. clodus*. Fig. 2, Section of the body cut vertically. Fig. 3, Section of the head of its natural size.

Description of a HYDROSTATIC BALANCE, by which the specific gravities of minerals may be ascertained without calculation. By Benj. H. Coates, M. D.
Read June 16, 1818. Plate XV.

The present instrument has arisen from one lately presented to the Academy, in which the common steel-yard is employed for this purpose.

The object of the alteration is, without rendering the instrument more complicated, or more troublesome in its application, to save the labour and inconvenience of calculation. By means of it the specific gravity of a mineral may be ascertained in a few moments, and without pen and ink, or any other assistance than a cup of water. With the aid of the neatness and convenience of the instrument on which it is grafted, it is hoped to be a practical saving of time and labour to the mineralogist.

The lever resembles that of a common steelyard, and is contrived to balance exactly, by making the

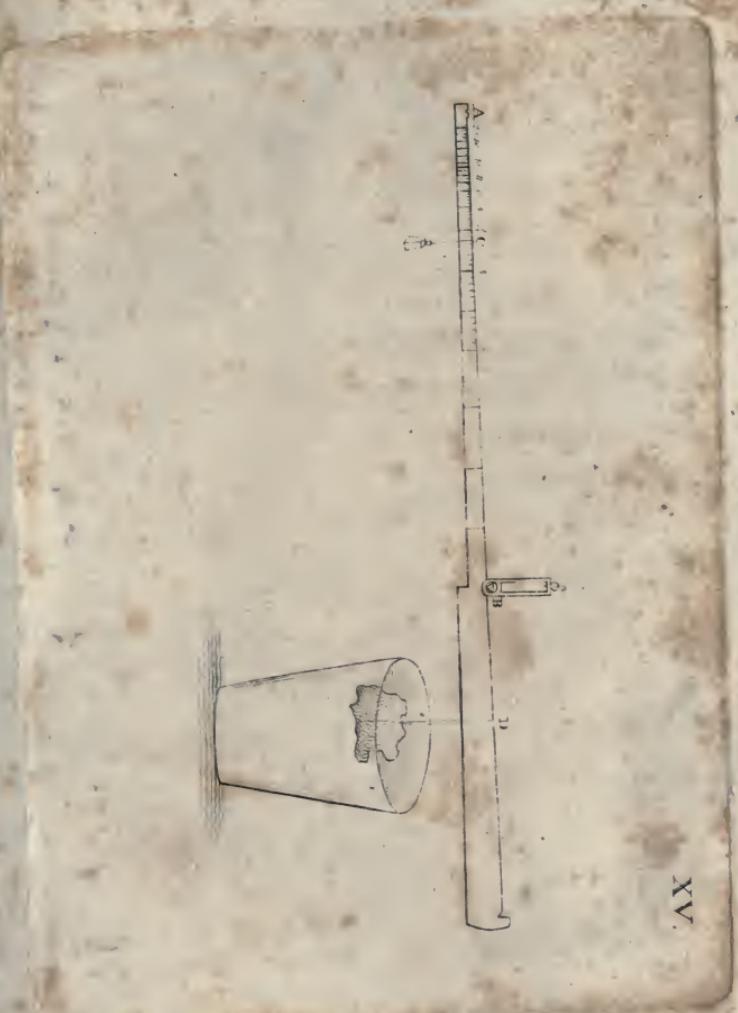
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Hiodon CLODALUS







XV.



shorter end wider, and with an enlargement at the extremity. The upper edge of each limb, is rectilinear, and free from notches, for the sake of accuracy in adjusting the weights.

The shorter end is undivided; but on the longer is inscribed a scale, of which every division, reckoning from the extremity of the lever, is marked with a number, which is the quotient of the length of the whole scale, divided by the distance of the division from the end. Thus at half the length is marked the number 2, at one-third, 3, at one-fourth, 4, &c. Also at two-thirds the length is marked one and a half, at two-fifths, two and a half, &c. And so of all the fractions, sufficiently minutely. These numbers extend as high as the specific gravity of platina;—the pivot of the instrument represents unity, and a notch is made at the farther end.

In using this instrument, any convenient weight is suspended by a hook from the notch at the end of the scale. The body under examination is to be suspended to the other end by a horse-hair, and slid along till an equilibrium is produced. It is then, without altering its situation on the beam, to be immersed in water, and balanced a second time by sliding the weight. The hook of the latter then marks the specific gravity on the scale.

The demonstration of this is very simple. The instrument being supposed in equilibrium, and $B D$ (see figure) and the weight of the counterpoise being constant, the weight of the body varies as the distance of the counterpoise from B , by the common principle of

the lever. Hence, if C be the place of the weight at the conclusion of the operation,

Weight in water : weight in air :: BC : BA.
And, by subtraction, the loss of weight in water : weight in air :: AC : AB; and hence

wt. in air AB

$\frac{\text{loss}}{\text{loss}}$ equal $\frac{AC}{AC}$ equal the spec. gray.; which is

the rule,

Q. E. D.

Substances lighter than water may have, if necessary, their specific gravity ascertained by the usual method; a scale of equal parts being cut on the opposite side of the beam, and the article to be weighed placed in a notch for the purpose. For mineralogy, however, this will seldom be necessary. The bottom of the notch A (at the smaller end) should be in a line with the edge of the scale, its sides being a little raised. The top of the shorter end should be rather the thickest part of it, to allow the horse-hair, by which the mineral is suspended, to swing clear. This mode will be found very delicate and accurate, and a hook must not be used, as it cannot be balanced.

The instrument, in this form, is exceedingly compact, and may be reduced to a simple rod.

The principle is capable of being applied (as in an instrument I have made) to an arc of a circle, with a rod resembling in its application a common bent lever.

Observations on the genus GLYCINE, and some of its kindred genera. By Stephen Elliott, of Charleston, S. C. Read June 23, 1818.

(Concluded.)

THYRSANTHUS.

Char. Ess. *Vexillum basi callosum, appendix; tubulus ex centro disci denticulatus, vaginans basin stipitis ovarii. Legumen coriaceum subteres, bilobulare?*

1. Frutescens.

Glycine frutescens. Willd. Sp. Pl. 3, p. 1067. Mich. 2, p. 63.—Persoon, Syn. Pl. 2, p. 301.

Anon. frutescens, Walt. p. 186.

Apios frutescens, Pursh 2, p. 474.

Hab. in humidis.

ARCYPHYLLUM.

Char. Ess. *Cerolla petalis viæ calyce longioribus. Filamentum solitarium juxta basin geniculatum. Legumen compressum falcatum, dispermum.*

1. *Simplicifolium.*

A. caule humili, erecto; foliis simplicibus, rotundatis, rugosis; floribus fasciculatis.

Glycine tomentosa, var. g. *monophylla,* Mich. 2, p. 63.

G. reniformis. Pursh 2, p. 486.

Trifolium simplicifolium. Walt. p. 184.

Hab. in aridis et cultis.

2. *Diforme.*

A. caule volubili, foliis subrhombeis, rugosis, inferioribus simplicibus, superioribus ternatis, racemis axillaribus summitate confertifloris.

Glycine tomentosa, var. b. *volubilis*, Mich. 2, p. 63.

Hab. in aridis et cultis.

3. *Erectum.*

A. Caule erecto, foliis ternatis, ovalibus, subacutis, reticulato venosis, racemis erectis axillaribus.

Glycine tomentosa, var. a. *erecta*, Mich. 2, p. 63.
Pursh 2, p. 486.

Trifolium erectum. Walt. p. 184.

var. a. *foliis distincte reticulatis.*

b. *foliis velutinis, racemis longioribus.*

Hab. a, in aridissimis frequens. b. *Abbeville Co.*
S. Car. a, D. Gourdine communicata.

To this genus belong an undescribed species discovered by Dr. William Baldwin in the vicinity of St. Mary's, Georgia, and the *Glycine reticulata*, *Caribaea*, *rhombifolia*, and perhaps many other species now attached to the genus *Glycine*.

AMPHICARPA.

Glyc. Ess. Flores caulinis plerumque steriles, fe-

guminibus compressis falcatis; radicales apetali, fertiles, leguminibus ovatis, terulosis, monospermis.

1. *Monoica.*

Glycine monoica. Willd. Sp. Pl. 3, p. 1055.—
Mich. 2, p. 64.—Pursh, 2, p. 485.

Anon. Caroliniens? Walt. p. 188.

To this genus the *Glycine subterranea*, *sarmentosa*, and *comosa*, probably belong; but as I am unacquainted with these plants, I have omitted their specific characters.

In ascribing to the caudine flowers of this genus a compressed falcate legume, I have relied on the general accuracy of Walter. I have never been able to discover one fertile. If this should be an error, while it would render the name I have given to this genus less appropriate, it would show more strongly the necessity of removing it from its present station. In truth I know no principles of classification by which the *G. monoica*, *tomentosa*, *angulosa*, *frutescens*, and *opios*, can continue members of one common family.

An account of the Crustacea of the United States. By
Thomas Say. Read July 7, 1818.

[Continued.]

Genus GAMMARUS.

Body thirteen-jointed exclusive of the head, and including the three-jointed tail; *antennæ* with the last joint composed of numerous minute ones, superiores as long or longer than the inferiores, four-jointed, penultimate joint with a seta at the apex, inferiores five-jointed; *feet* fourteen, the two anterior pairs monodactyle, subequal, hands oval, third and fourth pairs smallest; *tail* with small fasciculate spines above and bifid ones at tip.

SPECIES.

1. *G. *fasciatus.* *Body* whitish, translucent, with obsolete greenish bands; *eyes* reniform, situated at the outer base of the antennæ, terminal joint of the superior antennæ with about thirty articulations.

Inhabits the larger streams of fresh water.

Cabinet of the Academy.

Body punctured, fasciate with faint green, which after death becomes of a rufous colour; *superior antennæ*, second joint annulate with ferruginous, seta attaining the tip of the fifth articulation of the terminal joint, terminal joint with from twenty-five to thirty articulations; *inferior antennæ* hairy, second and third

Joint each with a ferruginous spot above, first joint of each pair, with a green spot on the inner side; feet hairy, faintly spotted with green, fifth and sixth pairs generally reflected above the back, seventh pair reflected when swimming; three last segments of the body composing the tail, each with three fascicles of short spines above; eyes marginal, smaller above; hands oval, palm unarmed.

Length not quite half an inch.

This species is a common inhabitant of our rivers, and is frequently introduced into Philadelphia, in the Schuylkill water; an individual placed in a glass of water, swam nimbly about sometimes upon his back, the superior antennæ being projected forwards, and the inferior pair decurved; when at rest it was placed on its side, with the body incurved; it was not very particular in the choice of food, it tore out of the shell, and eagerly devoured, a young *Lymnaea catascopium*; and also eat some vegetable food. The antennæ assists these animals very much in obtaining the minute particles of food, which abound in the water; when an object of a proper size comes within a moderate distance of his mouth, one of them strikes it with great dexterity into the grasp of the four anterior feet, the first pair of which appears to be most employed. It differs from the *G. pulex* of Europe, more especially in having reniform eyes. An extraordinary resemblance prevails, between this species and an inhabitant of the salt water, the only difference appears to be in the somewhat larger size of the latter, but not having succeeded in discovering a specific difference.

I consider them as the same; in colour they may differ inconsiderably.

2. *G. minus.* Eyes reniform; superior antennæ longer than the inferior ones, terminal joint with about twelve articulations.

Inhabits rivulets and small fresh water streams.

Cabinet of the Academy.

Body whitish, with a few very pale fulvous lateral spots; eyes reniform, blackish, placed at the exterior base of the superior antennæ; superior antennæ obviously longer than the inferior ones, seta short, attaining the tip of the second articulation of the terminal joint, terminal joint with about twelve articulations.

Length three-twentieths of an inch.

Found in brooks under stones, and may be readily discovered by taking a stone out of the water, and inspecting its inferior surface.

3. *G. mucronatus.* Eyes irregularly reniform, blackish; antennæ subequal; eighth, ninth, and tenth segments of the body mucronate above.

Inhabits the coast of the United States.

Cabinet of the Academy.

Antennæ subequal, superior ones with about twenty articulations in the terminal joint, seta attaining the tip of the fourth articulation; eyes somewhat reniform, truncate above, and forming an angle towards the upper base of the antennæ; eighth, ninth, and tenth joints of the body, terminating above in a strong

acute, somewhat elevated spine; rather smaller than *G. fasciatus*.

This species, which is an inhabitant of the salt water, I caught in the bay of Egg-harbour, and near the mouth of St. John's river, Florida; it is remarkable for the dorsal, immovable spines, by which it is very readily distinguished from others, but it is necessary to observe that in the male these dorsal spines are often less distinct than in the female, sometimes indeed, in this sex they are entirely wanting on the eighth and tenth segments, and that of the ninth is very small.

4. *G. *appendiculatus*. *Caudal segments*, and *three terminal segments of the body*, dentated on their posterior edges; *feet* in one sex, second pair didactyle.

Inhabits Georgia.

Cabinet of the Academy.

Clypeus not extended beyond the frontal curve; *eyes* moderate, oval, hardly extending above the inferior base of the superior antennæ; *feet*, anterior pair filiform, *hand* somewhat dilated, *nail* placed on the middle of the tip, short, curved, acute, second pair of feet in one sex with one of the hands very large, didactyle, nearly equal to one half of the body, subobovate, inferior edge rounded, superior one rectilinear, terminating at the base of the thumb in an obtuse angle, tip or palm of the hand tridentate, lower tooth very small, fingers deflected nearly right angularly, thumb grooved, groove forming an emargina at the outer tip for the reception of the tip of the finger; (in

the other sex the second pair of feet are monodactyle; longer than the first, with the lamellary appendice of the inner base much elongated, compressed, attenuated, pediform, two-thirds the length of the foot) body, eighth, ninth, and tenth segments dentate at their posterior tips above, with seven strong, prominent teeth, of which the dorsal one is shortest; tail, two first segments armed at tip above with two prominent acute teeth.

Length three-tenths of an inch.

This animal corresponds with the generic characters in having the accessory seta to the antennæ, and the moveable spines on the tail, though it is observable that these spines are few in number and not fasciculated. But in the form of the four anterior feet it differs very much from the other individuals of this genus, and makes a near approach to *Orchestia*, from which it is distinguished by the length of the superior antennæ, of which the characters agree with those of *Gammarus*. The remarkable elongation of the inner lamella of the second pair of feet in one sex is a very striking peculiarity of this species, more especially observable as the feet themselves are concealed when at rest, and that so effectually, that although confident of their existence it was not without considerable difficulty that I brought them to view. In consequence of this relative position of the second pair of feet and their appendices, the latter would be mistaken for the feet, by any one who was not attentive to the general organization of these parts. It is probable that this animal will form a new

or sub-genus, which would very properly arrangement under *Gammarus*.

*Genus *LEPIDACTYLIS.*

Essential Character.

Antennæ four-jointed, furnished beneath with plumose ciliæ, intermediate ones with an accessory seta placed at tip of the third joint. *Clypeus* produced between the bases of the intermediate antennæ and acute. *Feet*, two anterior pairs simple; equal, third and fourth subequal, didactyle, fingers lamelliform; remaining feet spinous without nails.

Natural Character.

Body compressed-oval.

Head distinct, subquadrate, extended into a short acute rostrum between the intermediate antennæ; *antennæ* subequal, four-jointed, *inferiores* rather longer, incurved, second and third joints dilated beneath, compressed, and ciliated beneath with plumose, elongated hairs, these two joints when at rest form a continued oval, the former is dolabritiform, terminal seta eight-jointed, verticillate, *superiores* porrected, basal joint dilated, depressed, second one much smaller, placed on the inner tip of the preceding, and with that joint furnished with plumose ciliæ beneath, third joint much smaller than the second, and furnished at the tip with a triarticulate accessory seta, parallel with

the terminal joint, terminal joint of about eight segments, and not longer than the preceding joints conjunctly; *eyes* convex, touching the anterior edge of the head; *thorax* with seven segments, and lateral scales; *feet* fourteen, two anterior pairs in each sex simple, filiform, equal, third and fourth pairs equal, didactyle, hands compressed, not dilated, finger rounded, thumb oval, lamilliform, remaining feet gradually larger, compressed, armed with short spines, and destitute of a nail; hind pair largest, antipenultimate joint lengthened above, and nearly attaining the tip of the following joint which is crenate and spinous on the edge, terminal joint compressed, serrated, and spinous on the edges, and truncate at tip; anterior pairs of feet furnished at their inner bases with oblong oval moveable lamellæ.

Abdomen of three segments, abruptly narrower than the thorax, each furnished beneath with natatory feet, consisting of short, rounded peduncles, supporting double setæ, of which the outer ones are longest, third segment abruptly inflected at tip; *tail* inflected, armed with bifid styles.

SPECIES.

L. *dytiscus. *Eyes* orbicular; *body* when recent white, with an abbreviated internal ferruginous vitta, including the alimentary canal; *accessory seta* of the intermediate antennæ, attaining the tip of the fourth segment of the terminal joint; anterior pairs of feet hairy.

Length, male one quarter, female three twentieths of an inch.

Inhabits coast of Georgia.

Cabinet of the Academy.

This active little animal is one of the many inhabitants of small pools of water left by the recess of the tide on the coast of Georgia and Florida, and it is probable, considering the vast range of animals on this eastern part of North America, that it occurs much farther north, especially as it is found in considerable numbers in the localities I have assigned to it. In those shallow pools its presence may be ascertained by the numerous and irregular tunnels which it forms in the sand, like miniature representations of those of the mole, only less rectilinear. These little tubular edifices are formed by the animal when in pursuit of a recluse prey, and are occasionally interrupted by his ascent towards the surface of the water. In these excursions his motion is extremely rapid, and appearing but for a moment, he is readily mistaken for a *Dytiscus* or *Hydrophilus*, which have a similar habit of occasionally visiting the surface of the water; but for the purpose of respiration. I was at first deceived by this similarity of movement, until by more attentive observation, induced by the rapidity with which it penetrated the compact sand and by its not remaining at the surface of the water a sufficient time to inhale a supply of air, or to collect a globule of it for gradual consumption, it was evident that it was an animal of perfectly distinct habits and organization from those of simple stigmata.

When placed in a vessel of water, it was observable that the oval appendices attached near the inner base of the anterior pairs of feet, assist in the process of respiration

by propelling the water to the natatory feet, by which it was again propelled backwards; this constant stream carries with it the more minute animals usually abundant in sea water, which in passing are arrested by the plumose antennæ by the palpi and anterior feet, and are conveyed to the mouth for food.

Lepidactylis is related to the Gammarii by the accessory seta of the intermediate antennæ, but is generically distinct by the form of the four anterior pairs of feet, and that of the antennæ, which combined have furnished the essential characters for this genus.

Genus AMPITHOE. Leach.

Body of thirteen segments; *antennæ superiores* as long or longer than the *inferiores*, four-jointed, seta of the penultimate joint obsolete, *inferiores* five-jointed; *feet* fourteen, the two anterior pairs monodactyle, subequal; *hands* equal, oval; third and fourth pairs smallest; *tail* destitute of fasciculated spines, armed with bifid styles at tip.

SPECIES.

1. A. *serrata**. *Antennæ* equal, short, stout; *eyes* large, approximated, suboval; eighth, ninth, and tenth segments of the body serrated.

Inhabits Egg-harbour.

Cabinet of the Academy.

Clypeus acute; *antennæ* nearly equal, short, stout, attaining the base of the sixth segment of the body; *eyes* large, black, oval, placed at the outer base of the superior antennæ, and approximated above; *hands* with about three equidistant, prominent, spinose teeth on the inferior

edge or palm, the nail or thumb curved, acute, and attaining the third tooth; eighth, ninth and tenth segments of the body serrated, the last more conspicuously so.

Length two fifths of an inch.

Remarkable by its large eyes, short, stout antennæ, and serrated appearance of the hind part of the back, occasioned by the elevation of the tip of each of those segments above the base of the succeeding one.

2. A. *dentata**. Posterior edge of the dilated thighs strongly serrated; *eyes* distant above; *clypeus* obtuse.

Inhabits South Carolina.

Cabinet of the Academy.

Antennæ moderate, not remarkably robust; *clypeus* not projecting beyond the frontal curve; *eyes* small, subtriangular, distant above; *hand* truncate at tip, destitute of prominent teeth, but furnished with a few rigid hairs, nail closing on the tip and not on the inferior edge; *feet*, posterior edge of the dilated thighs conspicuously serrated with from eight to twelve teeth; terminal segments of the body not remarkably serrated.

Length nearly three tenths of an inch.

A very common inhabitant of the fresh water marshes of South Carolina.

3. A. *punctata**. *Antennæ* elongated, inferiores longer; *hands* oval, not dentated; *body* with numerous black points.

Inhabits Great Egg-harbour.

Cabinet of the Academy.

Eyes ovate, acute and distant above; *clypeus* not projecting into an angle; *antennæ* elongated, superiores two thirds as long as the inferiores, inferiores nearly equal to

the body, attenuated; *hands* not dentated, equal, oval, not larger than the carpus; *body* and *antennæ* above, sprinkled with numerous black points, fasciated on the abdominal segments; *feet*, posterior pair not serrated on the hind edge of the dilated thighs, but armed with three or four short spines.

Length rather more than three tenths of an inch.

Perfectly distinct from the preceding species by the more elongated and less robust antennæ. I obtained it several years ago at Great Egg-harbour, where it is not uncommon.

Genus TALITRUS. Latr.

Body composed of thirteen segments exclusive of the head; antennæ superiores shorter than the peduncle of the inferiores; feet fourteen; tail armed with several bifid spines at tip.

SPECIES.

I. *T. longicornis**. *Inferior antennæ* with about thirty articulations in the terminal joint; *hand* oval, *palm* sinuated.

Inhabits the seabeach of New-Jersey.

Cabinet of the Academy.

Eyes oval;† *superior antennæ* not extending beyond the second joint of the peduncle of the inferior ones; *inferior antennæ* as long as the body, with the third joint of the peduncle rugose above and beneath, terminal joint composed of about thirty articulations; *first pair of feet*

* Unless we carefully examine the eyes we are apt to be deceived as to their form, being sometimes but partially coloured in the dried specimen.

filiform, inner tip of the antipenultimate joint dilated into a compressed, accessory tubercle at the inner tip, penultimate joint dilated and rounded at the inner tip for the reception of the nail; *hands* of the second pair of feet dilated, oval, *palm* elevated in the middle into a large rounded tooth, which touches the middle of the thumb when at rest, leaving an interval on each side, an elevated obtuse angle at the tip of the palm, on the inner side of which the thumb rests when closed, lower edge of the hand rather longer than the palm.

Female with the second pair of feet simple, compressed, destitute of hair or short bristles, and unarmed with a nail, terminal joint of the antennæ twenty-eight to thirty articulate.

Length seven tenths, breadth one fifths of an inch.

The manners and habits of the animals of this genus are similar; they do not inhabit the waters, but are found in considerable numbers upon sandy beaches of the sea, and are well known to every observer by the name of *sand flea*; they leap about with great agility, feed upon and conceal themselves under the rejectamenta of the sea, and for repose and security dig a hole in the sand, to which they skip at the approach of danger; they furnish an excellent food for the shore birds, which may be seen constantly running about in pursuit of them. The young males of this species have the antennæ not longer than the females, but the number of articulations is not diminished. Colour in the dried specimen brownish. The *longicornis* differs in some of its characters from the genus *Talitrus* as defined by Dr. Leach, particularly in the form of the two anterior pairs of feet, which approximate it to *Orchestia*.

2. *T. grillus.* Inferior antennæ with about twenty-five articulations in the terminal joint; hand oval, palm parallel with the thumb.

Talitrus grillus. Pedibus decem; anticis apice incrassatis, chelatis. *Latr. Hist. Nat. Crust. et Ins.* from *Bosc.*

Inhabits sandy beaches.

Cabinet of the Academy.

Eyes suborbicular or a little angulated; *superior antennæ* hardly exceeding the second peduncular joint of the inferior ones; *inferior antennæ* much shorter than the body, a little hairy but not rugose upon the third peduncular joint, terminal joint composed of about twenty-five articulations; *anterior pair* of feet with a prominent obtuse tubercle on the antipenultimate joint, penultimate joint dilated into an obtuse tubercle at the inner tip to receive the thumb; *hand* of the second pair of feet oval, dilated, *palm* oblique, unarmed, convex so as to receive the thumb without an interval, as long as the lower edge of the hand.

Female, articulations in the terminal joint of the antennæ the same as in the male; the second pair of feet are like those of the female of the preceding species.

Length rather more than half an inch.

Found in great abundance on the sandy beaches; when alarmed will seize a portion of its food and skip with it towards its hole in the sand; it will not voluntarily venture into the water. I have considered this as the *T. grillus* of Bosc, notwithstanding the characters which he refers to that species, "dix pattes, le deux premier terminées par une main oval a crochet simple." I do not know of any animal that will correspond with these

characters, the present one certainly does not; but as he further observes that, "cette espèce se trouve en grande quantité sur les côtes de l'Amérique septentrionale," and that the posterior antennæ are half as long as the body, I conclude that he has certainly been mistaken in the number of the feet of his specimen, and has considered the anterior pair as palpi when describing this animal. It is smaller and more slender than the preceding, and becomes red when dried. This species has the same relation to the genus *Talitrus* as defined by Dr. Leach, that the preceding one has.

Genus PODOCERUS. Leach.

Antennæ pediform, inferiors longer, stouter, and with the terminal joint inarticulate or very obscurely articulated; two anterior pairs of feet monodactyle, *hands* dilated, that of the second pair of feet larger, *palm* unarmed with teeth.

SPECIES.

*P. cylindricus**. *Hands* of the second pair somewhat cylindrical; *eyes* small, not prominent.

Inhabits Egg-harbour.

Cabinet of the Academy.

Eyes small; *front* acute; *superior antennæ* attaining the tip of the third joint of the inferiores, *inferior antennæ* much thickened, hairy, the terminal joint shorter than the preceding one; *hand* of the second pair, not larger than the carpus, *palm* longitudinal, rectilinear, *thumb* much shorter than the hand; third, fourth, and fifth pairs of feet short, much compressed, nail as long as the preceding

joint, which is suboval and narrower than the one before it; sixth and seventh pairs reflected, and of the usual cylindrical, elongated form.

Length less than three twentieths of an inch.

This is one of the many species of this class of animals which may be found inhabiting marine plants, *Fucus*, &c., and also Zoophytes, devouring the fabricators of the latter and seeking a fugitive prey amongst the leaves and branches of the former.

*Genus UNCIOLA**.

Essential Character.

Antennæ subpediform, superiores with an articulated seta at the base of the fourth joint; *anterior feet* monodactyle; second pair with adactyle compressed hands; *coxae* not dilated.

Natural Character.

HEAD deeply emarginate beneath the eyes to receive a segment of the base of the lower antennæ (ear?), and projecting into an acute angle between the bases of the upper antennæ; *eyes* hardly prominent, placed on a somewhat advanced portion of the head, between the bases of the upper and lower antennæ; *antennæ* robust, terminal joint of the superiores rather longer than the preceding one, furnished at base with an articulated seta, inferiores rather shorter, thicker, terminal joint shorter than the preceding one; THORAX composed of seven segments each furnished with feet, of which the first pair are largest, *hand* dilated, monodactyle, second pair with a dilated, compressed, subequal carpus and hand, the latter

simple, with two minute hooks at tip, posterior pair longest; *coxae* simple or not remarkably dilated; **ABDOMEN** of three segments; *natatory feet* with the filaments subequal; *tail* of three segments, the first and second bearing each a pair of bifid styles, terminal one suborbicular, with a pair of simple, depressed styles, concealed by the others.

SPECIES.

M. irrorata*. *Eyes* hemispherical; *hands* of the anterior feet with a longitudinal palm, and prominent tooth, those of the second pair compressed, ciliated.

Inhabits Eggharbour.

Cabinet of the Academy.

Accessory seta of the superior antennæ attaining the fifth articulation of the terminal joint; *eyes* conspicuous, rounded; *palm* of the anterior feet a little convex in the middle, a large obtuse tooth at base; nail attaining the carpus, which terminates so as to appear like a second tooth of the hand; second pair of feet ciliated, with a subtriangular hand, segments of the abdomen mucronate each side behind; *colour* when recent, pale with very numerous red points.

Length three tenths of an inch.

Not being able to refer this animal to any existing genus, I was induced to frame the present genus for its reception. It approaches *Gammarus* by having the accessory seta to the superior antennæ, but is excluded from that genus, and its congeners, such as *Talitrus*, *Dexamene*, *Leucothoe*, &c., by the absence of the enlarged lamellated coxae, which are so conspicuous in those genera. To the genus *Pherusa* it seems to approach by

the form of the second pair of feet,* but Dr. Leach observes that there is no seta to the antennæ of that genus. By the characters drawn from the simple coxæ, the thick, stout antennæ, emarginate lateral angles of the head, position of the eyes, and in fact from the general habit of the body, it seems to arrange naturally with *Podocerus*, *Jassa*, *Cerapus*, *Atylus*, &c.; from all of which it is sufficiently distinguished by the form of the four anterior feet. It is not uncommon on the branches of *Fucus*, *Sertularia*, &c. in the estuaries of New Jersey.

ORDER IV. LÆMODIPODA. *Latr.*

Head united to the first segment of the thorax; *eyes* two; *stomata* two; *maxillæ* four, placed in a transverse line, labiform; *branchia* vesicular, at the base of the feet, subcaudal none.

Genus CAPRELLA. *Lam.*

Body linear. *Antennæ* four, the upper ones with the last segment as long as the three others and articulated, lower ones shorter; *anterior pair of feet* appearing to arise from the head; *branchia* globular or oval, substituted for the third and fourth pairs of feet; *anus* with two little appendices.

SPECIES.

1. *C. geometrica**. *Body* above glabrous; *head* with a short acute spine before; *hand* of the second pair of feet with one acute and one very obtuse tooth.

Inhabits salt-water bays; common.

Cabinet of the Academy.

Head obtuse before, beneath gibbous, anterior segments of the body gibbous beneath, subcylindrical, three last segments shorter, convex above, terminal one smallest, and truncate at tip; second pair of feet with dilated, oval, compressed hands, armed with teeth, one of which is near the base, linear and almost parallel with the palm, the other large, obtuse, little elevated, placed near the base of the claw; *thumb* curved, suddenly attenuated within at tip, where it closes on the posterior tooth; *branchia* short, oval; three posterior pairs of feet armed with curved, acute claws, nearly as long as the preceding joint; terminal pair longest.

Length three tenths of an inch.

Found on Fuci, &c.; motion moderate, walks like the larvæ of the Geometrica, and, like many of them, attaches itself when at rest in an oblique position by means of the three posterior pairs of feet. When recent the eyes are red; antennæ and feet annulate with reddish-brown, these annuli resemble spots of short opposite lines. *Body* with a few scattering reddish-brown spots.

2. *equilibra**. *Body*, first and second segments equal to one half of the whole length; *feet*, second pair placed in the middle of the body.

Inhabits South Carolina.

Cabinet of the Academy.

Head rather small; *clypeus* rectangular, not projecting into an acute spine; *antennæ*, superiores attaining the tip of the third thoracic segment, inferiores not attaining the tip of the second joint of the superiores, and ciliate beneath; *body*, first and second segments, subequal, cylindric, the latter rather longer, and one spined before the

insertion of the feet, and a little dilated at base, each more than thrice the length of the head, and together forming a moiety of the total length, third, fourth and fifth segments equal, each about half as long as the preceding one, sixth and seventh segments much smaller, subequal; *feet*, anteriores small, hand toothless, triangular-ovate, and with the carpus forming an oval mass, nail closing without interval, second pair very large, conspicuous, placed near the middle of the body, hand oblong-oval, palm rectilinear, bidentate, teeth nearly perpendicular, placed one before the middle of the palm, the other nearer the base, a third smaller tooth sometimes intervenes, thumb much curved, closing with a wide interval, the tip attaining the tip of the posterior tooth, and concealing with its base the anterior one.

Length about one inch.

A large species, remarkable for the size of the second pair of feet and their being placed nearly equidistant from the extremities of the body; I found them common in the bay of Charleston, particularly at Sullivan's island, on the two species of *Gorgonia* so common in the salt water creeks of our southern coast.

Genus CYAMUS. Latr.

Body suboval, segments transverse, anterior one confounded with the head, *feet* ten, robust, armed with a strong nail, third and fourth pairs spurious; *antennæ* four, superiores longer, of four articulations, of which the last is entire, *eyes* two; *stommatæ* two.

SPECIES.

*C. abbreviatus**. Hands of the second pair with the palm two toothed; *branchia* oblong oval.

Inhabits on the Balæna ——.

Cabinet of the Academy.

Body ovate, narrowed towards each end, *anterior feet* attenuated towards the base, hand smallest, *second pair* of feet with the hand much dilated, larger than the others, palm armed with two large, obtuse, nearly equal teeth, one placed near the base and the other near the tip, thumb as long as the palm; *branchia* oblong oval, rather more than half as long as the feet, placed upon the breast; *anus* simple.

Length less than one tenth of an inch.

This description is taken from several specimens, which were presented to the Academy by Mr. Reuben Haines, and which were procured by him from the Balæna ——.

It appears to differ from the *C. Ceti* more especially in being much smaller and having the branchia much shorter and more dilated. Doctor Leach has substituted for the name of this genus, that of *Larunda*, in consequence of the term *Cyamus* having been applied by Mr. Salisbury to a genus of plants.

ORDER V. ISOPODA. *Latr.*

Head distinct from the thorax, simple; *eyes* sessile, granular; *mandibles* destitute of palpi; *maxillæ* three pairs, exterior ones labiform, with two palpi united at base; *branchia* subcaudal.

Genus CYMOTHOA. Fabr.

Abdomen and *tail* composed of six segments, narrower than the trunk, the ultimate one larger, and furnished on each side with two compressed, pedunculated scales; *feet* similar, with very robust, entire nails, coxae large and conspicuous, resembling an accessory lateral articulation of the thoracic segments.

SPECIES.

1. *C. ovalis**. *Body* oval; *eyes* concealed, *head* attenuated and rounded before; *tail* terminal segment as long as the five preceding ones conjunctly, rounded at tip.

Inhabits the mouths of *Percæ*, &c.

Cabinet of the Academy.

Body glabrous, nearly oval; first segment longest, fourth and fifth broadest, those of the abdomen and two first of the tail nearly equal, gradually narrower and rounded with the curve of the body, ultimate segment of the tail rather narrower than the preceding one and as long as the four preceding ones conjunctly, rounded at tip and entire; *styles* not surpassing the line of the tip, equal, hardly longer than the peduncle, the inner one oval; *feet*, fourth, fifth, and sixth pairs largest, then the seventh, the anterior ones gradually smaller to the first pair, which are smallest.

Length one inch, breadth rather more than half an inch.

This species is often found attached within the mouths of salt water fish in our markets, more particularly, I believe, in those of the Perch (*Perca Americana*†, Bloch) and Black-fish (*Labrus Americanus*‡, Bloch),

† Described subsequently by Dr. Mitchell under the name of *Bodianus rufus*.

‡ Described subsequently by Dr. Mitchell under the name of *L. tautoga*.

and rarely in that of the Rock (*Perca Sexatilis*†, Bloch). I have not access to any descriptions of *C. Gaudeloupen-sis* and *Americana* that can be considered as specific, so that it is possible I have here named them erroneously. if this should prove to be the case, I will gladly embrace the first opportunity to reject the false name and restore the true one, that first given.

Nicholson in his *Essai sur l'Hist. Nat. de St. Domingo*, p. 343, pl. 7, fig. 2, gives an account and figures of a species of *Cymothoa* much resembling this, under the name of *Pou de Sarde*, *Pediculus marinus*. He found it in the branchia of a "Sarde."

2. *C. prægustator*. *Body* elongated; *eyes* conspicuous; *head* not attenuated, much longer than broad; *tail*, terminal segment as long as the seven preceding ones conjunctly.

Inhabits mouth of *Clupea Tyrannus*‡ of Mr. Latrobe. *Oniscus prægustator*. Mr. B. H. Latrobe, Trans. Amer. Philos. Soc. vol. v. p. 77, plate 1.

Cabinet of the Academy.

Body elongated, gradually attenuated before, from the sixth segment; *head* narrower than the first segment, elongated, transversely impressed near the tip, tip not narrowed; *eyes* conspicuous, oval, composed of punctures instead of granules; *antennæ* subequal, hardly attaining the middle of the eyes; *first, second, third, and fourth segments* nearly equal in length, the first rather longer, *fifth, sixth* and *seventh* shorter, the latter very much lunated to receive the abdomen; *abdomen* and *tail*

† Described subsequently by Dr. Mitchell under the name of *P. Mitchilli*.

‡ Described subsequently by Dr. Mitchell under the name of *C. menhaden*.

attenuated towards the base, terminal segment of the latter large, membranaceous, nearly as long as the seven preceding ones conjunctly, dilated at the base and gradually attenuated towards a point at tip, with a perceptible longitudinal line on the middle; *lateral styles* membranaceous, almost filiform, longer than the peduncles and much shorter than the terminal segment of the tail; *feet* gradually longer to the seventh pair, which are much longer than the others.

Length nearly two inches.

Belongs to the genus *Aega* of Dr. Leach.

It seems probable that this species resembles the *Gaudeloupensis*, but is larger; it is very commonly found in the mouths of the *mossbankers*, (*C. tyrannus*) as above mentioned; the body is generally more or less contorted, in compliance with the form of the part of the mouth to which it was attached. An interesting account of this species is given by Mr. Latrobe under the name which I have, of course, adopted; the lateral lamellæ of the tail, which he supposed to be single, are in reality bifid as in the other species of this genus. I had an opportunity to examine a number of these fish, and of them, many were infested with this animal, but by no means every one, as has been supposed. The fishermen say the *Fish-louse* is necessary to the life of the fish, and as a proof of it, they observe that if the *louse* be taken from him the fish will die, although thrown into the water; but it is probable that the death of the fish is not owing to the removal of the parasite, but its to being withheld too long from the water, as it is well known that this fish lives but a very short time when taken from the water.

3. *C. impressa**. *Body* oblong; *head* attenuated, terminating acutely between the bases of the antennæ; *tail* with the terminal segment widely emarginate at tip and as long as the five preceding segments conjunctly.

Inhabits —.

Cabinet of the Academy.

Body oblong; first, second, third and fourth segments contracting by desiccation, their posterior margins remaining elevated and glabrous in consequence of the more crustaceous consistence of those parts; seventh segment short, very much lunated to receive the abdominal segments, which with the two first of the tail are so approximated, as to appear on each side like lines; terminal segment shorter, and more depressed in the middle so as to appear almost bilobated, tip widely emarginated, not longer than the five preceding segments conjunctly; *head* attenuated to the tip, which is acute between the bases of the superior antennæ, which are very robust and nearly attain the anterior segment of the body; *eyes* conspicuous, granulated, marginal, oval; *feet* gradually longer to the fifth pair, which are longest, sixth and seventh pairs equal to the fourth.

Length one inch.

This specimen was presented to me by Mr. Titian Peale, who remarks that it was taken at Cape-may, New-jersey. Can this be synonymous with *C. ichtyola* of Mr. Latreille?

4. *C. lanceolata**. *Body* oblong-oval; *head* broader than long; *tail* dilated-lanceolate, carinate, equal to the six preceding segments conjunctly.

Inhabits —.

Cabinet of the Academy.

Body, the transverse less than half of the longitudinal diameter; segments narrower before and rounded, acute behind; edge not thickened; *antennæ* not robust; *abdomen*, segments suddenly narrower than the thoracic segments, subequal, the posterior ones gradually narrower, *terminal segment* dilated, lanceolate, a transverse impressed line at base, longitudinally carinated, carina obsolete towards the base, inner terminal joint of the lateral appendices triangular, outer one linear somewhat obliquely truncated at tip.

Length three fourths of an inch.

Found cast on the beach of Cumberland Island, Georgia.

5. *C. oculata**. *Body* elongate-oval; *head* trilobate behind, middle lobe smallest; *abdomen*, segments not shorter than the terminal thoracic ones; *tail*, terminal segment shorter than the four preceding segments conjunctly.

Inhabits the Sheepshead.

Cabinet of the Academy.

Body, transverse less than one third of the longitudinal diameter, lateral line forming a perfectly regular uninterrupted curve, segments gradually narrower to the base of the terminal segment, those of the abdomen and tail not shorter than the terminal thoracic ones; *colour* whitish with very numerous brown points; *head* broader than long, regularly rounded before, edge not thickened beneath, trilobate behind, middle lobe rather smallest; *eyes* large, conspicuous, facets regularly hexagonal; *tail*, terminal segment hardly broader than the preceding,

depressed, rounded at tip, not carinated, edge ciliate, nearly equal to the length of the four preceding joints conjunctly, inner lamella of the lateral appendices triangular, hind edge but little oblique, ciliated, and mucronate at the outer tip, outer lamella oblong-oval, ciliated on the inner edge and two-spined at tip.

Length half an inch.

Taken in St. John's river, Florida, on the Sheep-head (*Sciæna oviccephalus*, Bloch.)† Belongs to the genus *Æga* of Dr. Leach.

6. C. *immersa**. *Head* subquadrate; *thorax*, first segment profoundly emarginate for the reception of the head.

Inhabits —.

Museum of South Carolina, and Richmond museum.

Head transversely subquadrate, somewhat narrowed to the tip, which is truncated; *body*, *anterior segment* very large, profoundly emarginate for the insertion of the head, the lateral processes rounded at tip and nearly attaining the transverse line of the clypeus, with a considerable interval between the tip and the anterior angle of the head; *third and fourth segments* longer behind, above; *fifth segment* widest; *feet*, large joint of the fourth pair extended behind into a spine, that of the three posterior pairs obtusely produced behind, nails rather small; *abdomen* abruptly much narrower than the thorax; *tail*, terminal segment large, membranaceous towards the tip, lateral appendices very short.

Length nearly one inch and three fourths.

† This well known species has recently been described by Dr. S. L. Mitchell under the name of *S. ovic.*

The specimens above referred to are the only ones which have occurred, that of the museum of South Carolina was found by Mr. L'Hermenier at Gaudeloupe, that of the Richmond museum, I was informed, was taken on the coast of the United States.

Genus SPHÆROMA. Latr.

Body contractile into a sphere; *tail* entire; *lateral styles* foliaceous, bifld, lacinæ equal; *head* extended behind, on each side, into oculiferous lobes; *nails* bifid.

SPECIES.

*S. quadridentata**. *Body* oval; *tail*, terminal segment semioval, equal, *external lateral lamella* four-toothed.

Inhabits coast of Georgia and of East Florida.

Cabinet of the Academy.

Body oval, punctured; *tail*, terminal joint equal to the five preceding segments conjunctly, semioval, truncate at base and rounded at tip, surface equal, punctured, convex at base and concave before the tip, *lateral lamellæ*, interior one oblong-oval, acute, entire, carinate at base over the insertion of the exterior one, exterior lamella serrate on the outer edge with about four teeth, of which the anterior one is placed rather before the middle, smallest, minute, obsolete or wanting, inner edge rectilinear, ciliated; *colour* brownish or horn colour, when recent, usually varied with large whitish or rosaceous spots and with numerous minute brown points; incisures usually pale yellow; eyes and nails black; exterior lateral lamella immaculate.

Length of the female nine twentieths of an inch, male much smaller.

Varies very much in its colours, is of a plain brownish horn colour, rarely ferruginous, very often marked with two large patches of whitish or rosaceous, one of which is placed on the anterior disk and the other on the base of the tail, connected by a whitish dorsal line; sometimes we have a dorsal line only, extending from the head to the tail. I found these animals very numerous on the beach of St. Catherine's island, Georgia, concealing themselves under the raised bark, and in the deserted holes of the Teredo, &c., of such dead trees as are periodically immersed. They always swim on their backs.

(To be continued.)

A case of unusual arrangement in the ascending Cava and in the external Jugular Veins of the Human Subject. By William E. Horner, M. D. Read August 18, 1818.

While prosecuting a course of dissections in the year 1813, the subject of the present paper accidentally fell into my hands. After injecting its blood vessels with the view of making a dried preparation, I was much surprized to find, in the course of the dissection, that an important part of its vascular system deviated in a very singular manner from what is commonly observed. Having submitted the preparation to the examination of Dr. Wistar, late professor of anatomy, the interest he took in it induced me to present it to him, and it is now an article in the Anatom-

ical Museum, lately given by his widow to the university of Pennsylvania.

The peculiarities of the preparation are the following: The ascending vena cava, instead of receiving the hepatic veins and afterwards entering into the inferior part of the right auricle of the heart, takes its course on the right side of the spine, mounts up high into the thorax, forms an arch over the root of the right lung, and joins the trunk formed by the right and left subclavian and jugular veins. The trunk formed by these several unions, then enters the right auricle of the heart at the usual place of the descending cava. See Fig. 1, Nos. 3, 4, 5, 6.

This arrangement gives the preparation a very curious appearance when viewed anteriorly, see Fig. 2, Nos. 3, 4; for instead of the single arch formed by the aorta as usual, we find a double arch; one, the trunk of the arterial system and carrying the blood from the heart, the other the common trunk of the venous system and bringing the blood to the heart.

There is no vena azygos for receiving all the intercostal veins of the right side and a part of those of the left, the office of this vein being supplied by the ascending cava, as seen in Fig. 1, No. 11. The hepatic veins empty into the inferior part of the right auricle, at the usual place of the ascending vena cava. The right hepatic vein passes singly, the middle and left form a trunk. See Fig. 1, No. 8, and Fig. 2, No. 11.

The internal jugular veins have the usual course, the external deviate very much from it. The latter unite about the superior part of the sternum, making a fork, and into the middle of the fork passes the inferior thyroid vein, see Fig. 2, Nos. 8, 9. A common trunk is then

sent off to the right, which empties into the internal jugular vein just behind the clavicle. This trunk is concealed in the drawings by the clavicle. A vein of considerable size, marked 10, passes off from each side of the fork, and runs parallel with the clavicle to the inferior parts of the neck and to the shoulder.

In both drawings a dilatation of the abdominal vena cava and of the emulgent veins is very perceptible. This, I presume, arose from disease, as those parts were not subjected to greater violence in the injecting than others.

This subject was about seven years old at the time of death. He died of a dysentery; the veins of the mesentery were unusually distended with blood.

Anomalous distributions of the smaller arteries and veins frequently occur, particularly those of the upper extremity; but this case is an exceedingly rare one, as regards the course of the ascending cava. It commonly happens when any of the great vascular trunks are misplaced, that the unfortunate subject of it dies in a very short time after birth, or else lingers out a miserable existence for a few years to fall at last a victim. In this instance we have cause to admire an arrangement which, though unusual, was nevertheless perfectly adapted to the operations of life, and to the vicarious discharge of the functions of the vena azygos.

EXPLANATION OF THE PLATE.

Fig. 1. Side view.

A. Arm and scapula.

B. B. Ribs.

C. Clavicles.

1. Right auricle.
2. Right ventricle.
3. Descending cava.
4. Common trunk of left subclavian and jugulars.
5. Right internal jugular vein.
- 6, 6. Ascending vena cava, which is observed to make an arch over the pulmonary vessels and to join the descending cava.
7. The emulgent vein very much enlarged, and the vena cava just above it, in the same situation.
8. The hepatic veins entering into the lower part of the right auricle.
9. Aorta.
10. Pulmonary artery and veins.
11. Intercostal veins.

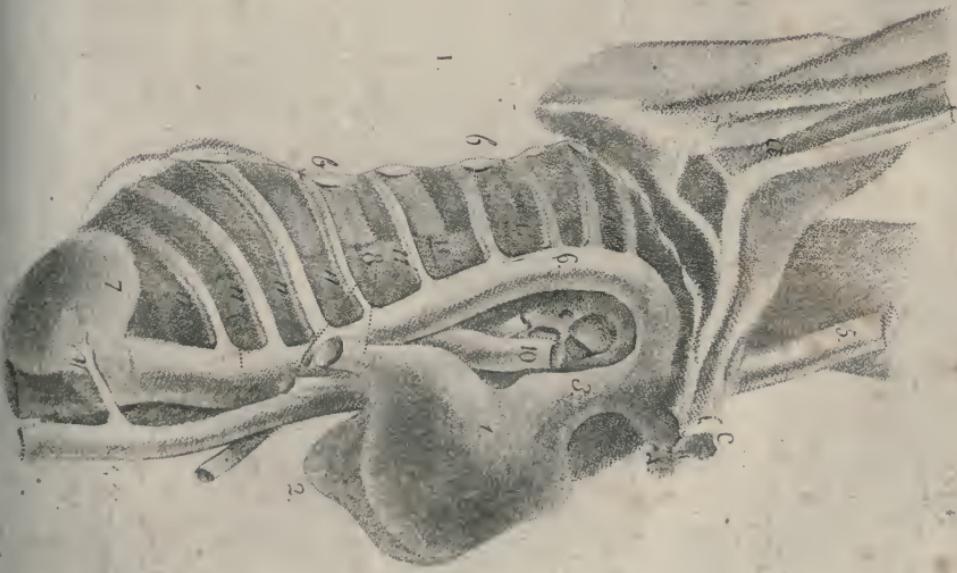
Fig. 2. Front view, showing the same as the preceding, besides the veins of the throat.

A, A. Clavicles.**B, B. Ribs.**

1. Right auricle.
2. Right ventricle.
3. Aorta.
4. Descending cava.
5. Ascending cava.
6. Trunk formed by the jugular and subclavian veins of each side.
7. Internal jugulars.
8. External jugulars.
9. Thyroid vein.



11.





- 10, 10. Small veins running along the clavicles.
 11. Hepatic veins.
 12. Ascending cava, the number is on its enlargement.
 13. Emulgent vein.
 14. Pulmonary artery and veins.
 15. Abdominal aorta.
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Notes on Professor Green's paper on the Amphibia, published in the September number of this Journal. By Thomas Say. Read October 6, 1818.

The following remarks occurred to me, in consequence of being induced to refer to authors, to verify my opinion respecting the modern genera of some of the species described in this paper.

Lacerta 5-lineata of Prof. Green is not the *L. 5-lineata* of Daudin. It belongs to the genus *Scincus*, and corresponds with the description of *S. 5-lineata*. It may be useful to observe, that when the tail of this species has been broken off and reproduced, the recent portion is of a fine blue colour, verging on ultramarine. This alteration in the colour of the tail, which I have traced through its different states of regeneration; gives to the animal a different aspect, which has in fact deceived many as to its identity. Daudin mentions a variety with a blue tail, which is doubtless the same. The blue tail of Catesby, Daubenton, Lacepede, &c. which is the *Lacerta fasciata* of Lin., is most probably also synonymous.

Lacerta hyacinthina, ibid, is now arranged under the

genus *Agama*. It has been distinctly described under the specific name *undulata* by Bosc, Daudin, &c. and is now the *Agama undulata* of authors.

Lacerta fasciata, ibid. This animal I have always been accustomed to consider either as the female of the preceding, or as that animal in a state of vernantia, or of old age. But within a few days having had an opportunity to observe several living individuals of the *undulata* in the vicinity of this city, I was confirmed in the opinion that the *fasciata* is no other than the female of that species. That those in which the blueish colour is wanting are not males in a state of desquamation was evident, as one of the individuals alluded to was about casting his skin, and the blueish colour of the sides was still visible though obsolete. This opinion is corroborated by the observations of Mr. Titian Peale, who informs me that he has dissected numbers of these animals, and that those which were destitute of the blueish colour and of the whitish cruciate mark beneath, proved to be females.

Salamandra rubriventris, var. ibid., appears to me to be the *S. rubra* of Daud., notwithstanding the ventral colour and semipalmated feet attributed to this last. The *rubra* is sprinkled with rounded, blackish points, more numerous above, about the size of pins' heads according to Daudin, and the tail is acutely carinated as in our specimens. The spots of the former are represented as being on a greenish brown ground, large, irregular and lateral; in these and other respects manifestly distinct.

Proteus Neo-Cæsariensis, ibid. Judging from the description, this is the same species as *Siren operculata* of Mr. Beauvois. It is described and figured in the Trans. Amer. Philos. Soc. vol. iv. Shaw supposes it a variety of

his *Siren Pisciformis*—Axolote mexicaine. Cuvier? The animal said by Mr. Schneider (Hist. Amph.) to have been caught in Lake Champlain is probably the young of *Salamandra alleganiensis*, Latr.

May not the supposed species described by Professor Green be the young of *Salamandra subviolacea* of Barton?

The above remarks would have been communicated to the author, had they been made previous to the publication of his essay; and we shall not attempt to conceal our approbation of his zeal in endeavouring to illustrate this much neglected and confused department of American Zoology.

Description of three species of Fish. By Samuel L. Mitchill, M. D. of Newyork.

APODAL.

ANGUILLA OCEANICA. The SEA-EEL.

The discriminating specific character seems to consist in the equal length of the upper and lower jaws; a tail considerably acuminated; a dark blueish border to the united dorsal, caudal and anal fins; and jaws armed with close-set sharp teeth.

The individual now before me, was taken in the Atlantic ocean, near Block island. He is one of a species which, as the fishermen say, never visits the bays and rivers. They salt his flesh, like that of cod and haddock, and bring it pickled to market. The price is the sixteenth of a dollar the pound.

The length of my specimen is fifty inches; the depth almost five; and the girth something short of twelve. After having been gutted and freed from offal, he weighed nine pounds; and frequently is several pounds heavier. The lips are remarkably thick and fleshy. Nostrils tubular. Eyes covered with the common skin. Branchial rays nine. The tongue smooth; fleshy at the sides and tip; and furnished with a distinct frœnum.

The teeth separate and acute: in the upper jaw, a single serrated row, which enlarges to a toothed patch reaching back along the palate, more than half an inch. In the lower jaw, traces of two rows of short and small teeth within the outer serrated row.

In the throat, two roundish patches of short file-like teeth above; and an oblong one on each posterior branchial arch below.

The jaws are even, there being neither the projection of the upper as in the conger, nor of the lower as in the common eel.

The anal, caudal and dorsal fins are continuous. Commencing immediately behind the vent, the anal proceeds backwards until it unites with the caudal, and the caudal is continued forward until it joins the dorsal, and this latter runs along until it reaches a point on the back about three inches in arrears of the origin of the pectoral fins. They are tipped all around with a margin or border of a dark or somewhat blueish colour.

The vent is nearer the head; the distance from that orifice to the extremity of the lower jaw being only twenty inches and a half.

The tail is not so round as in the common eel; or in other words it is more taper and elongated.

The lateral line very plain; beginning upward and forward of the pectoral fin, and proceeding straight toward the tail; but it disappears just before it arrives there. It is elevated enough to be traced distinctly by the finger.

The pectoral fins are small, rounded, and tipped with blueish white or pale blue. Rib spaces very evident.

Colour on the back, brown; on the sides, pale; on the belly, smutty white, not very unlike the brown variety of the cod-fish.

JUGULAR.

GADUS ALBIDUS. NEWYORK WHITING.

The specific differences appear to be, a wide mouth furnished with numerous sharp teeth; a lower jaw rather projecting beyond the upper; a beardless chin; a white and silvery complexion, especially about the sides and belly; and loosely-adhering scales over the whole skin.

The individual from which I make the present description, was taken in the Atlantic ocean, a few leagues from Sandy Hook, on what are called the Sea-bass banks. Is a handsome and well-shaped fish; and although he makes good food, is so little prized at market, that the fishermen generally throw him away. Is commonly, and indeed frequently, catched by the hook, among the Sea-bass (*perca varia*).

The specimen is nineteen inches long; three deep; and eight and a half girth. Grows large enough to weigh three pounds. Belongs to the section of *Gadus*, which has three dorsal fins, and a chin destitute of cirrhi; and consequently is nearly allied in ichthyological character to

the pollock of this market, or the *G. purpureus* of my memoir on the fishes of Newyork.

The jaws and palate are armed with numerous and acute teeth. The tongue itself is smooth, but its root is toothed.

Eyes very large, with a yellow iris and black pupil.

Tongue, palate and throat, of a smoky or sooty colour.

Nostrils double, and the opening near the eye, larger.

Lateral line begins at the back of the neck, above the gill-opening, and travels in nearly a direct course, with a furrowed or channelled depression, unto the middle of the tail.

Vent nearer the head. Tail about even. Gill-cover smooth and extending far back.

A deficiency of teeth in the front of the upper jaw; and a corresponding abundance of them in the front of the lower jaw to fill up the gap, when the mouth is closed.

Colour of the back dusky or brown, with a brassy hue, which is most conspicuous about the gill-cover and thorax.

Rays, Br. 8; Dor. 11—18—20; Caud. 34; An. 21—19; Vent. 7; Pect. 15.

ABDOMINAL.

SALMO AMETHYSTUS. GREAT TROUT of the Lakes.

The specific character may be derived from the teeth, which resemble crystals of amethystine quartz; and are continued in a row, along the upper jaw, on the outside

of the mouth to its angle, or point of connection with the lower jaw.

The specimen now on the table was a native of Lake Huron, and brought in fine preservation from Michillimackinac. Notwithstanding the removal of the intestines, he weighed thirty-two pounds and ten ounces. Is reported to grow as heavy as one hundred and twenty pounds. Is remarkably fat, rich and savoury.

His length is fifty-four inches; depth almost nine; and girth nearly twenty-four.

Figure very robust and stout. Head large. Back broad. Tail thick. Indeed, the form of the body is massive and solid.

Skin of the head smooth and scaleless; of the body, covered with small and moderately adhering scales.

Jaws very strong. Mouth ample and capacious. The gape slanting downwards; yet giving the lower jaw the appearance of being larger and stouter than the upper.

Teeth in the lower jaw, about sixteen on each side, situated in a single row. Teeth of the upper jaw in two rows, of which the outer row is more numerous than in the lower jaw, and the teeth somewhat smaller. These are continued externally, or on the outside of the mouth, quite to angle of the jaws. Teeth of the inner rows stand in formidable array.

All the teeth are distinct, and somewhat curved, or hooked, to hold firmly any thing that gets into the mouth. They are remarkable for having a reddish or purplish tinge, in their internal parts, resembling crystals of amethystine or rosy quartz; while their outsides and tips are colourless or hyaline. In some of them, the red or purple is faint.

The palate and lower part of the mouth, armed with sharp stiff teeth. Tongue beset with teeth; but of a smaller size.

Point of the upper jaw more blunt, than that of the lower: the former situated to receive the apex of the latter.

Iris yellow. Nostrils double. Lateral line begins near the upper part of the gill-opening, and proceeds in nearly a straight course to the middle of the tail. At its origin it is less distinct than it becomes in its progress.

Tail concave, almost to a fork; and the distance across from its upper to its lower extremity, eight inches.

Pectoral fins situated remarkably low on the thorax.

On the upper side of each abdominal fin, there is a horizontal strip, flap or appendage, acuminated backwards.

Colour brown on the back; and speckled with brown and dirty white down the sides; until the white, which in some places borders on cream-colour, succeeds to the brown, and overspreads the chin, throat and belly. In short, the complexion very nearly resembles that of the common salmon, or *S. salar*.

Rays, Br. 13; Dor. 13—0; Caud. 19, entire, propped at the outer or marginal base by five or six short and slanting rays above and as many below; An. 13; Vent. 9; Pect. 15.

*Description of several New Species of the Genus Esox,
of North America. By C. A. Le Sueur. Read
March 3, 1818.*

Genus ESOX. Lin. Cuv.

SPECIES.

1. *E. estor.* *Back* deep greenish brown, paler each side with rounded and oblong pale yellowish spots; *abdomen* white, distinguished from the colour of the side by an irregularly undulated line; *dorsal fin* larger than the anal fin; *scales* often emarginate, with a white line in the form of the letter V.

My collection.

Body a little less than four times as long as the head, and in depth one half as long as the head, subcylindric, depth at the posterior fins equal to that at the anterior ones, back rectilinear and parallel to the abdomen; *inferior jaw* reflected, longer than the superior one; *mouth* large, angle continued under the anterior canthus of the eyes, inferior lateral teeth pointed and compressed; *scales* entire or emarginate, emargin either obsolete, linear and profound, or obtuse, emarginated scales scattered, more approximated and larger near the abdomen, each with a transverse white, angulated, transverse line, which reflects brilliant tints of blue, green and yellow; *lateral line* obsolete; *fins* reddish yellow, marbled with blackish and deep green; *dorsal* and *anal fin* rounded; *caudal fin* large, lunate, with equal and rounded lobes.

B. 15, P. 18, D. 22, V. 11, A. 20, C. 20 $\frac{1}{2}$.

The largest specimen I have seen was three feet

long, it was taken by the seine at Buffalo on Lake Erie. The vulgar names Pike, Pickrel and Maskaliongè are given to it indiscriminately. In the language of the Wyandott Indians the general appellation to fish of this genus, is *Thue, ha, re, sah, an.*

2. *E. reticulatus.* *Body* with blackish lines, forming an irregular reticulation of more or less oblong spaces, above deep green, *sides* golden, *belly* white, immaculate, *scales* margined with black.

My collection.

Form and proportions of the body as in the preceding species; *fins* greenish, immaculate, *dorsal* and *anal fins* unequal, the former larger, *caudal fin* furcate with obtuse, subequal, lobes; *scales* margined with blackish, emarginate more profound than in the preceding species; *inferior lateral teeth* compressed, acutely edged and pointed; *lower jaw* longer, slightly recurved; *mouth* large, angle continued under the anterior canthus of the eye; *eyes* subovate, iris brown and yellow, pupil black; *colour* golden-yellow on the sides, passing to deep green, or blackish, on the back and head, with reflexions of slate grey more or less deep along the base of the back, rose, violet and green are generally mixed with the golden tint reflected by the scales.

B. 15, D. 18, P. 16, V. 11, A. 17, C. 19 $\frac{1}{2}$.

Length variable, from one to two feet; at Adams, on Connecticut river, where this species was observed, I was informed that specimens occurred which weighed seven pounds each.

Vulgar names the same as the preceding.

Those which are brought to the Philadelphia market

in the months of March and October, vary a little from individuals which I observed in the Connecticut river, by having the reticulated spaces smaller, more oblique, irregular in many specimens, and the fins are generally more reddish than green, which is probably owing to the influx of blood into their vessels after death, a circumstance common to many kinds of fish.

An individual seventeen inches long, had a Rock fish (*Perca Saxatilis*) in his stomach eight inches long.

Dr. Mitchell has noticed a species of *Esox* (Trans. Philos. of Newyork) which he believes to be the same as the *E. lucius* of Lin.; but as I have not seen any which could be referred to that species, I must consider this which I have described as a new one.

3. *E. niger*. *Body* each side golden yellow, with numerous black bands interrupted into about three parts, more distinct towards the head and more confused behind; *belly* white, immaculate; *back* and *head* deep black, immaculate; *pectoral* and *anal* fins orange-yellow; *dorsal* and *caudal* fins blueish, the latter slightly emarginate, lobes acute; *dorsal* and *anal* fins opposite, subequal, rounded.

My collection.

Form of the body as in the preceding species; the bands are confluent on the back and divided into about three oblique segments each side, more distinct and acute near the abdomen; *mouth* large, *inferior jaw* rectilinear, slightly longer than the superior one, *teeth* as in the preceding species; *scales* profoundly emarginate, somewhat bilobated; *head*, *inferior jaw* and *snout* without scales;

opercula, *preopercula* and *subopercula* scaly, as in the preceding species.

B. 17, P. 15, V. 9. D. 14, A. 14, C. $19\frac{1}{2}$.

This small individual was eight or ten inches long, and was found in Saratoga Lake. The fishermen assured me that it grew no larger; if this information is correct, it is a distinct species; but it may possibly prove to be the young of *reticulatus*. Further observation, however, is necessary to ascertain this point satisfactorily; mean time I think it proper to apply to it the above specific designation, drawn from its vulgar name *Black pike*.

A specimen of equal size with the above was brought from East Florida by Messrs. MacLure, Ord, Say, and Peale, which exhibited no sensible difference.

Mr. Say communicated to me the following notice of a species which inhabits East Florida, and which it will be proper to insert here, with the characters which he has given to it.

4. E. *phuleratus* (Say). *Body* dusky, with a vertebral fulvous vitta, and three or four fulvous fascia.

Inhabits East Florida.

This elegant species we discovered during a pedestrian excursion from Picolata to St. Augustine. The country at that time was partially inundated, and this specimen occurred in the foot way. But having been unsuccessful in our attempts to catch it, and not having noted the circumstance at the time, the above description is made entirely from memory, and therefore cannot be relied upon as exact with respect to the ground colour, or to the number of bands; there may possibly be also a lateral vitta beside the dorsal one. These bands and lines

are of a bright colour, so as to contrast strongly with that of the general surface, giving to the body a very strikingly harnessed appearance. It resembles *E. lucius* in the form of the head.

Description of three new genera of fluviatile Fish, POMOXIS, SARCHIRUS and EXOGLOSSUM. By C. S. Rafinesque. Read December 1st and 8th.

Genus POMOXIS.

THORACIC. Natural Family of SPARIDES.

Body elliptic, compressed, scaly, vent nearer to the head than to the tail. Head scaleless, jaws plaited, extensible, roughened by very minute teeth. Gill cover smooth, inerme, unserrate, nearly double, impressed by an angular and transversal depression, membranaceous and acute posteriorly. Thoracic fins with one spiny ray and no appendage. One dorsal fin opposed to the anal fin, both with many spiny rays.

Pomoxis Annularis. Annular Pomoxis. Pl. 17, fig. 1.

Silvery, back olivaceous, with some geminate brown transversal lines; a golden ring at the base of the tail; lateral line straight; dorsal and anal fins with six spiny rays shorter than the others, a blackish spot behind both fins; tail forked, blackish at the end; lower jaw longer.

The vulgar names of this fish are *Silver-perch* and *Gold-ring*. I found it in the river Ohio at the falls, in

August, where it appears to be permanent. Its length is from three to six inches. It is good to eat. The eyes are black, the iris silvery; the upper and back part of the head is gilt; the scales are deciduous. The fins are oliveaceous, the pectoral fins have fifteen soft rays, the thoracic fin one spiny and five soft rays, the dorsal six spiny and fourteen soft rays, the anal six spiny and sixteen soft rays, the caudal fin twenty-eight soft rays. This new genus is remarkable by the situation of the vent, and of the dorsal fin, its similarity with the anal fin, &c., which characters are almost peculiar to itself in the extensive family to which it belongs.

Genus SARCHIRUS.

ABDOMINAL. Natural family of ESOXIDES.

Body scaleless, slender, elongated, nearly cylindrical, slightly compressed; vent nearer to the tail. Head nearly square, jaws elongated, flat, with four rows of small unequal teeth, the lower jaw shorter and movable, the upper one immobil, with an obtuse knob at the end. *Pectoral fins round, without rays; but with a thin circular membrane surrounding an adipose base.* Abdominal fins with six rays. Dorsal fin nearer to the tail than the anal fin. Caudal fin lanceolated, and decurrent underneath.

Obs. This genus differs from *Esox* and *Lepisosteus* by the singular structure of the pectoral fins, from the last besides by having no scales, and from *Esox* by the shape of the tail. Its appearance is otherwise similar. The generic name means *fleshy arms*, the pectoral fins of the fishes being compared to the arms of other animals. I have only detected one species belonging thereto.

Sarchirus Vittatus. Pl. 17. fig. 2.

Back olivaceous brown, and with three longitudinal furrows, a black lateral band from the mouth to the end of the tail, belly white, with a lateral row of black dots on each side: jaws obtuse, longer than the head: anal and dorsal fins ovate acute with two transverse black bands; tail acuminate.

Obs. This singular fish inhabits the lower parts of the river Ohio, where I saw it in June; its vulgar names are Gar-fish and Ribbon-fish, the former of which is common to all the species of the genus *Lepisosteus*. Its length varies from six to twelve inches. It is not used as food, probably through the same prejudice that militates against Gar-fish. The abdominal fins are narrow, almost linear, acute, and with two transverse black bands, they are situated half way between the pectoral and anal fins: this last has ten rays, and the dorsal fin only nine. All the rays of the fins are soft. No appearance of a lateral line.

*Genus EXOGLOSSUM.**ABDOMINAL.* Natural Family of CYPRINIDES.

Body elongated, slightly compressed, covered with small scales, vent nearer to the tail. Head scaleless, flattened above, mouth terminal, toothless, lower jaw shorter, *with three or five lobes, the middle one larger, simulating a tongue*, lips very small. Abdominal fins with nine rays, dorsal fin opposed to them.

Obs. Mr. Lesueur has described, in the Journal of this Academy, a new fish under the name of *Cyprinus maxillingua*, which he considered as an anomalous spe-

cies, and he hinted that it might at some future period become the type of a new genus. This proper suggestion is now proved to be correct, by the discovery which I have made of three other species having the same singular character in the lower lip. I have therefore thought needful to establish such a new genus, which shall at present consist of four species; but I am certain that it contains many more, which may gradually be detected, when our rivers shall be more fully explored. I would have called it *Maxillingua*, if generic names of many compound Latin words were not to be avoided, according to the correct Linnean principles. *Glossognathus* having the same meaning in Greek, appears to me rather harsh, and for the sake of euphony I have preferred *Exoglossum*, which means *outside tongue*, and applies quite as well to the whole genus, wherein the middle lobe of the lower jaw assumes the appearance of a tongue jutting out of the mouth. This genus may be distinguished at first sight, by this striking character, from any other of the same family.

ENUMERATION OF THE SPECIES.

1. *Exoglossum Lesurianum. Cyprinus maxillinguia*, Lesueur. See his description, page 85, of this Journal. The specific name of *maxillinguia* cannot be retained, because it applies to all the species of the genus: it may rather be employed as a designation for the section of the genus furnished with a trilobated lower jaw.

2. *Exoglossum macropterum*. Pl. 17, fig. 3.

Head nearly square, forehead truncate, tuberculated,



3.



2.





mouth projected, lower lip five-lobed, pyramidal, silver-ed, variegated and reticulated with blackish, lateral line straight but faint. All the lower fins elongated, the pectoral reaching the abdominal, the anal reaching the tail, dorsal fin with twelve rays, tail forked.

Obs. I found it in the Ohio, at the falls, where it is called *Stone-toter*, in reference to the hard tubercles of its head. It is quite a small fish, from two to three inches long. It is used for bait. The mouth projects in a short and obtuse snout: the iris is large, and gilt. Pectoral fins, lanceolate acute, as long as the head and with twelve rays; abdominal fins lanceolate acute, situated nearly half way between the head and the vent, but not reaching it. Dorsal fin nearer to the head than to the tail, anal fin with ten rays; caudal fin with twenty. All the rays are soft of course, as in the whole family. Scales very minute. This species, distinguished by so many secondary characters, may be the type of a subgenus, which may be called *Hypentelium*, in reference to the five lobes of the lower jaw. The species with a three-lobed jaw may form then another section under the former name of *Maxillingua*.

3. *Exoglossum annulatum*. Pl. 17, fig. 4.

Head narrow, forehead smooth and convex, lower lip trilobated, body oblong olivaceous, back blackish, a black ring at the base of the tail; lateral line curved downwards at the base. Fins olivaceous, pectoral fins elliptic-obtuse, not reaching the abdominal: dorsal fins in the middle of the back with nine rays; caudal fin forked.

Obs. I detected this species in June 1817, in the Fish-kill, which falls into the Hudson river above the Highlands;

it is very common there, and called *Black-chub*, a name often given to many species in the United States. Length from three to six inches. It is used as food. The upper part of the head is black, the cheeks and gill covers are olivaceous, the iris is large and grey. The tinge in the body is rather variable, the back being either blackish or brownish, and commonly with an olivaceous shade, the sides are olivaceous or nearly brownish, the belly is of a pale olivaceous or nearly whitish; but the black ring of the tail is constant. The scales are much larger than in the foregoing species. The dorsal and anal fins have nine rays, this last does not reach the tail. Pectoral fins with fifteen rays; abdominal fins lanceolate acute, rather far apart, and much nearer to the vent than to the head. Caudal fin with twenty-four rays.

4. *Exoglossom nigrescens.*

Head short, forehead smooth and convex, lower lip trilobated; body oblong blackish, lateral line nearly straight; pectoral fins short, oboval; dorsal fin in the middle of the back, tail slightly forked.

Obs. I noticed this fish in 1806, in Lake Champlain; but mistook it then for a variety of the *Cyprinus melanotus* of the river Hudson, and I have to regret that I did not take an exact drawing of it. But it is however sufficiently distinguished from the *E. annulatum*, by the want of caudal ring, and its deeper black tinge, which extends to the fins: I did not notice the number of their rays. Its length varies from two to eight inches. It is used as food, and called by the vulgar name of *Black Chub*, like the foregoing.

An account of the Crustacea of the United States. By Thomas Say. Read September 22, 1818.

(Concluded.)

Genus STENOSOMA. Leach.

Body sublinear; *tail* two or three jointed, ultimate joint destitute of lateral appendices, furnished beneath with two parallel laminæ, attached by their external margins and opening like valves; *antennæ*, *exteriores* elongated, *interiores* very short.

SPECIES

1. *S. irrorata**. *Body* oblong, third segment broadest, attenuated to the tip of the tail, which is three toothed, middle tooth longest.

Inhabits Egg-harbour; common.

Cabinet of the Academy.

Body oblong, attenuated before and behind from the third segment, second, third and fourth segments longest, nearly equal; *tail* with the first and second segments equal, short, third equal on each side to the preceding, but obsolete above, terminal segment as long as the six preceding ones conjunctly, longitudinally somewhat elevated on the disk, tip with two crenæ forming obtuse lateral teeth and a more prominent middle one; *antennæ* half as long as the body, interior ones very short, attaining the tip of the third joint of the *exteriories*; *eyes* somewhat hemispherical, placed on the middle of the lateral margin.

Length, female rather more than one half of an inch.

Very common in bays and inlets of the coast on fuci, &c.

2. *S. filiformis**. *Body* very much elongated, linear; segments distant emarginate each side; *antennæ*, exteriores subclavate; *tail* cuneiform at tip.

Inhabits Egg-harbour.

Cabinet of the Academy.

Body appearing of only seven segments exclusive of the ultimate one, of equal breadth throughout, sometimes covered with very short filaments; segments emarginate, each side, and separated by wide insisures; ultimate segment nearly as long as the four preceding ones, contracted in the middle of the margin, and suddenly attenuated near the tip into an obtusely cuneiform termination; *head* elevated on the disk into a tubercle which is sometimes double; *eyes* hemispherical, very prominent; *antennæ* robust, intermediate ones very short, exterior ones more than half as long as the body, terminal joint perceptibly somewhat thicker than the preceding.

Length two fifths of an inch.

Found in company with the preceding species, and may be readily known by its linear form.

Genus IDOTEA. Leach.

Body oval, *caudal* segments two or three, ultimate one largest, destitute of lateral appendices, furnished beneath with two laminæ, which are elongated, parallel, attached by their external margins and opening like valves; *antennæ* subequal, short.

SPECIES.

1. *I. cæca**. *Body* ovate, attenuated behind to an acute point; *antennæ* equal, approximated at base, without

interval; three anterior pairs of feet monodactyle; *eyes* inconspicuous.

Inhabits coast of the United States.

Cabinet of the Academy.

Body broadest at the third segment; three abdominal segments narrowest; *head* quadrate, immersed, depressed, a profound fissure on the lateral edge; *antennæ* as long as the head, equal; *tail*, first segment short, second somewhat trilobated, middle lobe interrupting the preceding segment above, *ultimate segment* half as long as the body, attenuated to an acute point, convex and subcarinate, above, margin near the tip suddenly depressed; *feet* gradually longer to the posterior ones which are longest; three anterior pairs robust, monodactyle, remaining ones simple, unarmed, furnished with rigid hair or setæ; *nails* of the hind pairs rectilinear, tipped with setæ.

Length nearly three tenths of an inch; one specimen was upwards of two fifths.

Found in the small pools of sea-water, left by the re-fluent tide. Colour when recent, whitish, varied with brown dots, which are sometimes nearly united into bands; *eyes* milk-white; head with a transverse black band, which is angulated behind, a large milk white spot on the back and a smaller triangular one before the tail, both sometimes obsolete; swims on its back, and conceals itself in the sand; found as far south as Florida.

2. I. *triloba**. *Body* oval, somewhat oblong; *segments* with the lateral processes convex; *intermediate antennæ* short; *feet* armed with strong curved nails.

Inhabits Egg-harbour.

Cabinet of the Academy.

Body composed of seven segments, *tail* of two; *segments* of the body with the lateral processes, very convex, lobated, first segment shortest; *head* transverse, oval, unequal on the disk, an impressed transverse line behind, sinuate anterior edge, and impressed with a longitudinal abbreviated line; *antennæ* filiform, rather distant, intermediate ones short, exteriores with the terminal joint rather more than half as long as the preceding one; *eyes* very prominent, hemispherical, placed in the middle of the lateral margin; *tail* narrower than the body, first segment trilobated, middle lobe much the largest, convex, ultimate segment rather longer than the three preceding ones conjunctly, subtriangular, very convex on the disk, margin near the base depressed and channelled, tip depressed, acute; *feet* rather long, armed with curved, acute nails.

Length one fourth of an inch.

Found with the preceding species, is remarkable by the lobate appearance of the lateral processes. Of the *I. triloba* a new genus might be formed with the greatest propriety, as the description will evince.

Genus ASELLUS. *Geoff.*

Tail one large segment; *caudal appendices* exserted, bifid, inserted near the middle of the hind margin; *exterior branchial valves* rounded, attached by the base; *tarsi* simple; *eyes* minute; *antennæ* four, setaceous, the last segment many-jointed.

SPECIES.

1. *A. communis**. *Body* oblong oval, furnished with short rigid hairs; *interior antennæ* equal to the peduncle of the exterior ones; *caudal appendices*, peduncle depressed.

Inhabits small streams of fresh water, under stones.

Cabinet of the Academy.

Body oblong-oval, a little narrowed before, segments transverse, subequal, indistinctly emarginate on the edges each side, hairy; hairs very short on the disk, longer on the edges and feet; third and fourth segments linear, the anterior ones a little curved forwards and the posterior ones backwards; *head* narrower than the first segment, and not longer; *superior antennæ* extending to the base of the tail; *inferior antennæ* equal to the peduncle of the superior ones; *eyes* obovate, oblique, prominent, black; *tail* as broad as the segments of the body, transverse-suborbicular, equal to the two last segments conjunctly, depressed, and a little prominent between the appendices; *appendices* as long as the tail, *laciniæ* subequal, peduncle dilated; *anterior feet* hardly longer, monodactyle, unarmed; *thumb* as long as the hand; *hand* oval; *carpus* triangular; *remaining feet* gradually longer to the hind pair, which is longest, first and second joints suboval, gibbous above, third joint triangular, extended over the base of the succeeding one and tipped with long hairs, fourth and fifth linear; *tarsi* half as long as the preceding joint, simple, acute.

Length one fourth of an inch, breadth less than one tenth.

A very common species in our fresh waters, particular-

ly in rivulets under stones. It is frequently introduced with the Schuylkill water into Philadelphia. The female may be distinguished from the male by a valvular pectoral follicle in which the young are protected. In one of these I counted twenty-eight young ones.

2. *A. lineatus**. *Body* oblong; *interior antennæ* much shorter than the peduncle of the *exteriores*; *caudal appendices*, peduncle cylindrical.

Inhabits South Carolina.

Cabinet of the Academy.

Body oblong, not distinctly attenuated before; *segments* subequal, entire; *head* at base equal to the preceding segment, a sinus each side in the middle; *eyes* prominent, black; *antennæ*, *exteriores* as long as the body in one sex, in the other longer, *interiores* nearly attaining the tip of the second joint; *hands* with a prominent angle on the middle of the inferior edge, thumb closing on and surpassing the angle, shorter than the hand; *nails* somewhat bifid at tip; *terminal caudal segment* longitudinally subovate, styles elongated cylindrical, equal to the terminal segment of the body, *laciniae* very unequal, inner one nearly thrice the length of the outer one, truncate at tip; *colour* pale brown with a double dorsal brown line, united at the tip of the tail, a brown line or two each side of the tail.

Length nearly one fourth of an inch.

This animal is not an uncommon inhabitant of the swamps in the forests of South Carolina. It might be referred to the genus *Janira* of Dr. Leach.

Genus PHILOSCIA. Latr.

Caudal styles four, simple, saliant, lateral ones biarticulate; *antennæ*, exteriores eight-jointed, interiores obsolete; *tail* abruptly narrower than the body.

SPECIES.

1. *P. vittata**. Fuscous, glabrous, margin and two broad vittæ cinereous.

Inhabits the United States, common.

Cabinet of the Academy.

Head above transversely oval; *eyes* longitudinally oval, granulate; *antennæ* with minute distant hairs, ultimate joint tipped with a seta; *body*, first segment rather longer than the others, which are nearly equal; *tail*, segments subequal, terminal one rounded at tip, not longer than the preceding one, and attaining the tip of the first joint of the external styles, intermediate styles setaceous at tip, rather shorter than the external ones; *head*, *body*, and *tail* with the margin and two broad vittæ cinereous.

Length one-fifth of an inch.

Very common under stones, wood, &c. in moist situations.

2. *P. spinosa**. Brown, oblong-oval, with numerous spines above; *feet* armed with short setæ beneath.

Inhabits Georgia.

Cabinet of the Academy.

Body brown, elongate-oval, armed with numerous spine-like tubercles; sixth and seventh segments produced on each side behind, acute; the latter attaining the base of the fifth succeeding joint; *abdominal* and *caudal*

segments somewhat glabrous, terminal segment surpassing the first joint of the lateral styles; *antennæ* rough and subspinose before, terminal joint glabrous, pale; *feet* beneath armed with short distant setæ.

Length nearly one-fifth of an inch.

Under stones, old wood, &c. in moist situations near Savannah, Georgia.

Genus ONISCUS.

Caudal styles four, lateral ones biarticulate, intermediate ones concealed by the terminal segment of the tail; *antennæ*, exteriores eight-jointed, interiores obsolete; *tail* not abruptly narrower than the body.

SPECIES.

*O. affinis**. *Head* and *anterior segments* of the body scabrous; *tail* glabrous, terminal segment attenuated, attaining the tip of the inferior styles, and the middle of the last joint of the exterior ones.

Inhabits North America; common.

Cabinet of the Academy.

Body dilated, oval, somewhat depressed, sides a little rounded, not rectilinear; *head* and *anterior segments* of the body scabrous, posterior segments gradually less so; *tail* glabrous; terminal segment, almost subulate, attaining the middle of the last joint of the exterior styles, and exactly equal to the interior ones; *colour* fuscous with a cinereous edge and submarginal line, which are united on the tail into a broad margin, disk with a few cinereous spots.

Length half an inch, breadth three tenths of an inch.

Inhabits damp places, under stones, decaying wood,

&c.; when thrown on its back, turns with difficulty; exceedingly like the *O. asellus*, which was some years since in great repute in some parts of Europe for its supposed virtues in the cure of pulmonary and other diseases, but which is rejected as worthless by the present pharmacology; I consider ours as distinct on the authority of Mr. Latreille's description of the European species; he observes that "les appendices inferieures et intermediaires de la queue dépassent la pièce supérieure et terminale du corps."

Genus PORCELLIO. *Latr.*

Caudal styles four, lateral ones biarticulate, intermediate ones concealed by the terminal segment of the tail; *antennæ*, exteriores seven-jointed, interiores obsolete; *tail* not abruptly narrower than the body.

SPECIES.

I. *P. spinicornis**. *Body* scabrous; *antennæ*, third joint with a mucronate carina above.

Inhabits North America, common.

Cabinet of the Academy.

Body scabrous with granules, black-brown, margin and submarginal lines cinereous, three dorsal lines of alternate yellowish subquadrate spots, of which the intermediate ones are smallest; *head*, *antennæ*, and *disk of the tail*, blackish, the latter with two or three small yellowish spots each side at base; *antennæ* with the third joint elevated above, and armed with an acute spine; *terminal joint of the tail* canaliculate, hardly surpassing the first joint of the exterior styles.

Length two-fifths of an inch.

A very common inmate of our houses, crawling up the walls in damp cellars, &c. It seems probable that it resembles the *P. scaber* of Europe, of which however we have no good description by which to judge.

2. *P. nigra**. Black, scabrous, immaculate; antennæ with the spine of the third joint hardly prominent.

Inhabits Pennsylvania.

Cabinet of the Academy.

Body black, immaculate, beneath whitish, granulæ numerous, elevated, very rough, segments of the tail margined behind with abbreviated, elevated lines, terminal segment acute, attaining the tip of the intermediate styles and the middle of the last joint of the others.

Length three-tenths of an inch.

This species differs from the preceding, by being uncoloured, smaller and much more rough.

Genus ARMADILLO. *Latr.*

Caudal styles four, lateral ones biarticulate, connivent with, and not longer than the terminal segment of the tail, second joint triangular; *antennæ*, exteriores seven-jointed, interiores obsolete; *body* capable of being rolled into a sphere.

SPECIES.

A. *pilularis**. Plumbeous, margin and submarginal line cinereous, three yellowish lines of spots on the disk.

Inhabits North America.

Cabinet of the Academy.

Body with very minute punctures, lateral margin, and submarginal line of spots, cinereous, three lines of large

yellowish opposite spots on the disk, segments with the hind edges whitish.

Length half an inch.

This species comes so near to the description of *A. maculatus* that I should have considered it the same, had it not been remarked that the *maculatus* is twice the size of the *vulgaris*, the former must therefore be much larger than our species, which is about equal in size to the latter, as figured by Rœmer. It is very common in moist places, under stones, in decaying wood, &c.

ORDER V. BRANCHIOPODA. *Latr.*

SECTION I. PÆCILOPA. *Latr.*

Genus LIMULUS. *Fabr.*

Head confounded with the *thorax*; *antennæ* none; *mouth* inferior, simple and central, surrounded by the feet; *mandibles* and *feet* didactyle; *coxæ* supplying the place of *maxillæ*; *tail* elongated, attenuated.

SPECIES.

L. Polyphemus. *Thorax* seven-spined above; *abdomen* above three-spined; *tail* about twenty-five-spined above; *feet*, second joint of the four anterior pairs, with about five moveable spines.

Monoculus Polyphemus of Linne.

Limulus cyclops. *Fabr. Syst.*

Limulus polyphemus. *Lam.*

Polyphemus occidentalis. *Latr.*

Limulus Sowerbii. *Leach. Zool. Miscel.* vol. ii.
pl. 84. *Young.*

Inhabits northern coast of the United States, very common.

Cabinet of the Academy, Peale's Museum.

Thorax sublunate, truncate at its junction with the abdomen, convex, margined on its outer and anterior edge, acute and elongated at the hind angles, seven sub-equal reflected spines on the disk, of which six are placed on two parallel, transverse lines, and transversely equidistant, posterior line on the edge of the truncature, lateral anterior ones bearing the eyes on their exterior side, seventh spine anterior and distant from the other, supporting two stemmata; *eyes* longitudinally oval; *feet*, second joint of the four anterior pairs, armed beneath with four or six moveable spines, of which two or three are approximated at tip, and two or three distant and placed longitudinally, second joint of the hind pair, with about two moveable spines and a much larger one at the inferior tip of the fourth joint; *abdomen* depressed, a longitudinal line of three, elevated, somewhat reflected spines, smaller than those of the thorax, anterior one placed at the base, intermediate one behind the middle, posterior one at tip over the insertion of the tail, lateral angles of the base elevated into a dilated, compressed, oblique spine, lateral edge with twelve alternately permanent and moveable spines, of which the latter are longer, hind angles elongated each side of the origin of the tail and acute; *tail* serrate above with from twenty to thirty spine-like teeth, which are unequal, inequidistant and shorter than one-fourth of the transverse diameter of the tail.

Length to the end of the tail, female nearly two feet, male about twenty inches.

The male differs from the female in being smaller,

and in having the hand of the anterior pair of feet, dilated, spherical, monodactyle, the thumb inflected at base, so as to form a right angle with the hand, compressed and obtuse at tip. In the immature state, the spines of the disk of the thorax and abdomen are very acute and prominent, but become more obtuse as the animal advances in age, so that in the full grown subject they are obsolete, often noted only by a hardly elevated tubercle browned than the shell. They are found in vast numbers in Delaware bay, in the bays of the Newjersey coast; and probably much further north. They never attempt to swim, but always crawl slowly on the bottom, the feet always concealed beneath the shell. When cast ashore by the waves, if they fall on the back, they cannot recover their proper position. Many people feed their hogs upon them, and it is said that some hogs that roam at large in the districts where they abound, become acquainted with the fact of their inability to turn themselves when placed on the back, and when there happens to be a scarcity, with a provident sagacity, they turn as many as they can eat, or as are within their view, before they proceed to satisfy their hunger. This fact with respect to one hog, was related to me on good authority.

When irritated they elevate the tail, which is acute at tip, but perfectly harmless. The boatmen make use of the thorax for baling their boats.

For the reception of her eggs, the female digs a hole in the sand with her feet, of considerable width, and but little depth, usually between high and low water marks. During this season, and for a considerable time previous to the oviposit, she is accompanied by a male, who at-

taches himself by means of his monodactyle hands, to the posterior processes of her abdomen. The connection endures so long, that the tergum of the female at the two posterior spines, is very much worn, by friction with the anterior part of the thorax of the male, and the posterior processes are often almost worn through, by the pressure of his thumbs.

The *L. Sowerbii* figured by Dr. Leach, seems to be the young of this species, as the description and figure agrees perfectly with it.

Var. β . Abdomen five-spined on the disk, of which three are in a longitudinal line as in the species, and a smaller one on each side in a transverse line with the anterior spine and nearer to the elevated lateral angles. This animal, which I have for the present considered as a variety only, is an inhabitant of the southern states and Florida, where they abound in considerable numbers; how far they may be found to the north I know not, or whether they inhabit the same districts with the species, but I have not observed them on this side of the Chesapeake bay. Although in general appearance it is perfectly similar to *L. Polypheus*, yet in consideration of the character here noted, I propose that it be separated as a distinct species under the name of *australis*.

Genus PANDARUS. Leach.

Abdomen at base covered by imbricate scales.

SPECIES.

*P. sinuatus**. Body dilated, thorax emarginate before, abdomen sinuate behind.

Inhabits dog fish, (*Squalus Canis?* Mitchill.)

Cabinet of the Academy.

Length one fifth of an inch.

Body longitudinally oblong-quadrata; *thorax* transverse-quadrata, somewhat narrowed before, emarginate between the antennæ, middle of the base rectilinear and fuscous, angles projected backward and rounded at tips; *antennæ* very short; *anterior feet* formed for suction, at tip oval or subreniform, and placed obliquely; *scales*, four subequal ones in a transverse line at the base of the abdomen, each transverse and rounded at tip, and two larger ones originating beneath the preceding, slightly dentate at tip and not concealing one half of the abdomen; *abdomen* quadrata, as wide as the thorax but rather longer, posterior edge with a central sinus and lateral one each side, posterior angles acute; *ovucts* filiform.

Very commonly occur in considerable numbers on this species of *Squalus*, attaching themselves more particularly about the bases of the flns. They are by no means so active as the *Caligus piscinus*, which also occurs in plenty on the *Cod-fish* of our coast.

Genus BINOCULUS. *Geoff.*

Body suboval; *thorax* large; *eyes* two; *abdomen* of three, or four transverse segments; *tail* setaceous at tip.

SPECIES.

B. *caudatus**. *Body* subovata; *thorax* semioval or parabolic, posterior edge retuse for the reception of the abdomen, no dorsal, or transverse anterior line; *antennæ exteriore*s laterally and horizontally extended, more than half

as long as the body, with short rigid hairs, interiores concealed; *feet* concealed, anterior pair near the base of the thorax and dilated at tip, posterior pair at the origin of the tail, extended obliquely, prominent, dilated, bisetous at tip; *abdomen*, basal segments very short, transverse, each side reflected, curvilinearly narrowed without interval, terminal segment longer, semiorbicular, narrower than the preceding ones and concealing the first caudal segment; *tail* half as long as the body, abruptly narrower than the preceding segment, segments three, basal one longitudinally quadrate, largest, second one transversely quadrate, narrower than the first in the female, elongated and attenuated in the male, third segment bifid and bisetous at the tip.

Length one fortieth of an inch, male smaller.

Cabinet of the Academy.

I have placed this parasite in Geoffroy's genus *Binoculus*, not in consequence of the particular definition of that genus, but from a general resemblance in the outline, and similarity in the number and proportion of the segments of the body, which it unquestionably bears, to the singular animal discovered by that author, now the type of the genus.

In these two animals there are however striking dissimilarities, which it is unnecessary here to particularize, as those who are conversant with the generic characters as laid down by Mr. Latreille, will immediately perceive them by the above description.

This parasite was found in considerable numbers, on various parts of the body of the specimen of *Callianassa*, described on page 238 of this Journal. The two sexes of nine tenths of the specimens were in coitu, the male adhering to the tail of the opposite sex, so as to conceal

by his body the two terminal segments. This adherence was so pertinacious, as to be permanently maintained after submersion in spirits of wine; a circumstance, which combined with the appearance of the living animals, was well calculated to deceive the ordinary observer into a belief of the unity of the two sexes so connected. Thus the thorax of the male appearing to the eye connected to the thorax of the female by a pedicel, would seem, unless minutely examined, to be no other than the abdominal portion of the same individual; nor would an ordinary magnifier exhibit the truth.

SECTION III. LOPHYROPA. *Latr.*

Genus CYTHERE.

Shell bivalve, concealing the head; eyes confluent; antennæ two, ciliated; feet eight.

SPECIES.

C. bifasciata*. *Valves* ovate, viewed above and beneath, lateral view suboval, convex above, somewhat rectilinear beneath; a dorsal indentation behind the most elevated part; clothed with minute dense hairs; colour greenish-testaceous, tipped with black, the posterior spot emarginate above when the valves are closed, two black bands, the posterior one a little undulated and connected with the anterior one by a dilated, dorsal line, which terminates a little before the anterior band; *antennæ* as long as the valves, ciliae obsolete; *feet* white.

Length one fortieth of an inch.

Var. a. *Valves* dusky green, banded and spotted with darker green, nearly as in the species.

In considerable numbers, in small shallow pools of fresh water. The specimens here described were found in Georgia and East Florida.

Genus DAPHNIA.

Shell bivalve; head distinct; antennæ generally four, ramosæ; feet eight or twelve; eye one.

SPECIES.

1. *D. angulata**. *Body* viewed laterally suboval, contracted before, gibbous above near the posterior edge, beneath ventricose in the middle; *back* subovate, acute behind and contracted before; *sides* striate with numerous, minute, parallel, oblique lines; *hind edge* of the body with a prominent angle in the middle, which is obtuse at tip, above the angle it is ciliated; *antennæ*, four filaments on the superior branch, and five on the inferior branch; *colour* white or red.

Length one tenth of an inch.

Cabinet of the Academy.

Very common in the stagnant marsh water of the forests in the southern states.

2. *D. rotundata**. *Body* viewed laterally ovate, narrowed before, rounded behind, and destitute of any prominent angle, and of gibbosity above; lateral oblique lines obsolete; *venter* deeply ciliated; *antennæ*, superiores three-branched, a small spine above at the insisures of the joints, inferiores five-branched; *colour* white.

Less than half as large as the preceding.

Cabinet of the Academy.

Found in the stagnant marsh water of the forests, in the southern states.

Genus CYCLOPS.

Body elongated and attenuated behind; *thorax* abbreviated; *eye* one; *antennæ* two to four, simple; *feet* six to ten, hairy; *tail* long, bifid.

SPECIES.

*C. navicularis**. *Body* oval, attenuated behind; *thorax* semioval, glabrous, rounded before, truncate behind, sanguineous, hind angles acute; *tail* and *feet* white, the former as long as the thorax, attenuated, terminal joint bifid, seta four as long as the tail, the outer ones shorter, two small equal spines at the base of each pair, and one subequal one on the exterior side of the bifid part of the tail, a little before the base of the seta; *anterior antennæ* two thirds the length of the body, spinose, white, extended each side horizontally, recurved, and more robust near the base, and attenuated to the tip.

Found in considerable numbers in stagnant fresh water of the southern states. Swim by jerks, being alternately at rest and in motion, the female carries her eggs in two follicles, which are attached one on each side, near the base of the tail, of the same colour as the thorax, and vastly large in proportion with it, being nearly two thirds the size. Eggs spherical, from twenty-five to thirty or more in each follicle, consisting each of a dark nucleus and paler border.

Observations on some of the Animals described in the Account of the Crustacea of the United States. By Thomas Say.

OCTYPODE (*Sesarma*) *reticulatus*. It would be more correct to refer this species to the genus *Grapsus* by its oral characters, than by its habit to *Ocypode*.

GRAPSUS *cinereus*. Since publishing the description of a species which I referred to this name, p. 99, I have found a distinct species, which from its locality I judge to be the true *cinereus* of Bosc and Lat. It is very numerous, inhabiting the bay of Charleston, the southern coast generally, and East Florida as high as fifty or sixty miles up the river St. John. I have not met with it so far north as the coast of New Jersey. It is widely distinct from the species before mentioned, although the brief description which has been given of it by authors, will apply equally well to both. Mr. Latreille interrogatively refers to Sloane's *Cancellus marinus minimus quadratus* as synonymous with *cinereus*; but as that species, from the lateral thoracic curvature, general form of the body, and mode of life, is without a doubt intended for the species described page 99, under which I have quoted it, we must suppose that it is an anonymous species, and not the *cinereus*, nor yet the *minutus*, to which it next approaches. I therefore appropriate to it the name of *pelagicus*, significant of its mode of life. The *cinereus* differs from the *pelagicus* in many striking characters, in having the thorax quadrate, the lateral edge not being arquated, nor having a sinus near the anterior angles, and the three terminal joints of the feet are not ciliate with hair on the an-

terior edge as in *pelagicus*, and the carpus is destitute of a spine. It is further distinct from the latter, and approximated to *reticulatus* above mentioned, by the granulated cheeks and sides of the body, and the abruptly smaller, orbicular, terminal joint of the abdomen in the female, inserted into a profound sinus of the penultimate joint. These and other traits contribute to refer it to my indicated genus *Sesarma*. It is probable, this genus will comprehend the land species, of the present genus *Grapsus*.

Ocypode pugillator. Although this species approaches nearest to the genus *Uca* of Dr. Leach, yet it is at the same time widely distinct from it. In a work now publishing, the *Nouv. Dict. d'Hist. Nat.* Mr. Latreille has revived a genus, which Buffon called **GELASIMUS**, to include this species, and its two kindred ones.

Astacus affinis and *Bartoni* vary somewhat in their armature, but the form of the rostrum in each species continues constant. The latter species has the hands differently proportioned, with respect to the thumb, and more or less muricated. They are extremely common in the pine-barren marshes of the southern states, and particularly in those of Georgia and Florida.

Lupa hastata. I have often had an opportunity of observing the feet of this species regenerating; one of the joints, I think the third, appeared first, the remainder of the foot was as it were doubled, and was gradually elongated until the tip of the foot was disengaged.

We found the *hastata* in the river St. John, Florida, as far as Fort Picolata, one hundred miles from the sea, where the water is potable.

Dr. Leach informs us, that the fishermen of England believe that the *Portunus depurator* insinuates its flat-

tened hind foot into, and destroys the oyster; the same strange story is related of *L. hastata*. This story may have arisen from the accidental insertion of the foot into the oyster, for in this case the oyster would close his shell and detain the foot, and perish in this position. This supposition was suggested to me by seeing an *Ardea herodias* flying with a pendant leg, to the toe of which a *Venus mercenaria* was attached.

In the description of the parasitic worm, p. 67, the words "body silvery above and spotted with red," should be struck out, and substituted by *eyes two, black, oblong*. It stands thus in the MSS. and how the error has occurred I know not. It is most probably a *Fasciola*.

LUPA pelagica is not uncommon on the southern coast.

HIPPA talpoida. If Fabricius gave a false character to the *H. emeritus*, as Mr. Latreille supposes, in attributing to the terminal joint an ovate form, it is very possible that there is but one species of the genus.

STENOSOMA irrorata. The female is blackish, sometimes immaculate, usually margined with whitish, sometimes with large, white, marginal spots. The male is pale immaculate.

Length, male nine-tenths, female nearly seven-tenths of an inch.

The tail of *Idotea chelipes*, Latr. is described as tridentate, but the character "pedibus subchelatis," whence its name, is so remarkable, as to forbid the supposition of its being the same as this.

Appendix to the Account of the Crustacea of the United States. By Thomas Say. Read December 1.

The following species were discovered since the publication of their respective genera, in the preceding part of this work.

Genus LUPA.

For generic characters see p. 65.

*L. maculata**. Clypeus four-toothed; thorax reticulated, covered with minute granules; anterior feet three-spined on the third joint before; carpus two-spined; abdomen, second segment mucronate each side.

Inhabits coast of Georgia and Florida.

Cabinet of the Academy.

Thorax crowded with minute granules, distributed equally, and with the anterior and posterior feet above, chocolate brown with crowded, suborbicular, unequal, white spots, giving to the whole surface a reticulated appearance, lateral teeth ciliated; *clypeus* with four small teeth, of which the intermediate ones are rather larger and more distant, septum of the intermediate antennæ prominent, dentiform; anterior canthus of the eye obtusely dentiform above, and more prominently so beneath; *anterior feet*, third joint three-spined before, spines unequal, anterior ones largest, an obtuse spine or angle separated from the hind tip by an impressed line, which curves above to the middle of the tip, and thence towards the anterior edge; *carpus* with three elevated, or equal lines, of which two are abbreviated and the outer one terminated in a spine, inner edge with a spine, and two

obsolete ones on the outer tip; *hands* with a strong spine at base and five elevated, granulated lines, one of which terminates in a short spine at the base of the thumb; *fingers* with impressed lines and incurved at tip; *pectus* white; *cheeks* pubescent; *abdomen*, second segment mucronate each side, third, fourth, fifth and sixth segments in the female, reddish yellow at base.

Length two and a half, breadth four inches, nearly, exclusive of the elongated spines.

Resembles *L. hastata*, but is at once distinguished from it by colour, by having four small teeth to the clypeus, a spine each side of the second abdominal segment, armed carpus and many other differences; from *L. pelagica*, to which it also approaches, it differs in colour, in having only three spines on the third joint and the anterior feet, &c. But it seems to be more closely allied to *L. reticulatus*, it however differs much from the figure given of that species.

The above description was taken from the dead subject. I have not seen a living specimen.

Genus CANCER.

For generic characters see p. 57.

SPECIES.

1. *C. limosa*.* Thorax equal, convex, with about three serrate teeth each side; clypeus with a fissure; fingers white.

Cabinet of the Academy.

Inhabits shores of the northern states.

Thorax transversely somewhat semicylindrical, granulated each side, three lateral serrate teeth granulated

on their edges, and an anterior one hardly distinct from the posterior elevated supercanthus of the eye; *superior eye lid* with two obsolete fissures, anterior supercanthus destitute of a prominent angle; *clypeus* divided in the middle by a fissure, lateral segments regularly and obtusely arcuated at the edge; *labrum* prominent, undulated; *cheeks and sides of the thorax* densely granulated, a conic tooth beneath the anterior tooth of the edge of the thorax; *anterior feet* equal, olivaceous-green, immaculate, beneath fulvous or yellowish; *carpus* with a prominent obtuse spine within, beneath which there is no angle; *hands* rounded above and beneath, fingers deflect-
ed, white or yellowish, obtusely and somewhat regularly dentated within, thumb often purplish above at base; *ab-
domen*, second segment of the male abruptly much nar-
rower than the first and third, third much wider than the
fourth, penultimate one with equal transverse diameters
and not wider at tip than the terminal segment, which is
widest near the middle in consequence of being much
arcuated at base.

Length about one inch and one fifth, breadth one inch and a third.

Not uncommon in muddy places of our southern coast. It resembles *C. Panope*, but is sufficiently dis-
tinct by the more convex thorax, colour of the fingers,
and form of the segments of the clypeus, which in *Panope*
are slightly undulated; in *Panope* also the carpus has a
projecting angle beneath the spine, which is wanting in
this species; a striking difference is observable in the se-
cond abdominal segment, which is deeply emarginate at
the posterior angles, and not narrower at base than the
first segment.

2. *C. mercenaria**. *Thorax* subequal, about four lateral very obtuse teeth; *clypeus* with a fissure, lateral segments three-lobed; *fingers* black at tip.

Inhabits the southern states.

Cabinet of the Academy.

Body maculated when recent; *thorax* each side divided by four sinusses into four very obtuse teeth, which are rectilinear at tip and hardly prominent beyond the thoracic curve, cheeks and sides not distinctly granulated, and destitute of the conic tooth beneath the anterior thoracic one; *orbita* suborbicular, no distinct sinus at the posterior canthus, inferior lid entire and simply concave in the middle of the edge, a profound fissure in the anterior canthus; *clypeus* unequal, an indented fissure in the middle, the lateral segments somewhat three-lobed, anterior one most prominent; *labrum* not prominent in the middle; *pectus* of the male with a hispid fascicle on the second and third segments each side; *carpus* within dilated into a very obtuse, obliquely compressed tooth, beneath which there is no angle; *hands* unequal, rounded above and beneath; *fingers* black, at base colour of the hand, teeth obtuse; *tibia* of the remaining feet fasciculate above and beneath with rigid hairs and punctured each side; *tarsi* densely hirsute above and beneath, a longitudinal fascicle each side at base, tips glabrous; *abdomen* of the male, second segment hardly narrower than the preceding, third segment hardly wider than the next, convex each side, lateral edge regularly rounded, penultimate segment slightly wider at tip than the base of the terminal segment, ultimate insisure nearly rectilinear or but slightly curved.

Length three inches and one fourth, breadth four inches and a half.

Esteemed as food and sold in the Charleston market, tied up in small parcels of from four to eight together. It attains to a much larger size than either of the preceding species, from which it may be distinguished by the form of the clypeus, lateral teeth, abdominal segments, &c.

3. C.* *aculeatus*, Hirsute; thorax each side, arms and feet above with numerous erect spines; *clypeus* emarginate in the middle and each side.

C. spinifrons, Herbst? Lat. Hist. Nat. Sonin. vol. v. p. 347.

Inhabits coast of the southern states.

Cabinet of the Academy.

Body above with numerous filiform hairs; *thorax* variegated with very pale ferruginous, and whitish, armed with about six blackish, acute spines each side, of which four are in a marginal series, the anterior one smallest and placed at the posterior canthus of the eye; *clypeus* deeply emarginate in the middle, and more obtusely so each side, minutely dentate, with three indented lines, and four or six-spined at tip; *orbita* without distinct fissure, above three-spined, beneath spinous; *antennæ*, exteriores more than half the length of the thorax; *feet* with four or five small teeth above on the third joint, that of the anterior pair with two prominent acute spines at tip separated by the impressed band, second joint of the anterior feet dentated on the anterior edge; *carpus* with fifteen or twenty erect, acute, blackish spines; *hands* large, unequal, spinous, spines erect, blackish, more obtuse towards the

inferior edge; *fingers* striate, black, armed with obtuse teeth; *tibia* of all the feet spinous above; *tarsi* hairy beneath.

Length about nine tenths, breadth one inch and one tenth.

Found on the coasts of Georgia and E. Florida, and generally occurs concealed in a large species of gelatinous *alcyonium* which is frequently cast up by the waves. A species of *Balanus* is often attached to their thorax. This does not agree with the description of *C. spinifrons* as quoted in Rees' Cyclopædia from Fabricius, but it may possibly approach in character to that of Herbst as quoted by Latreille. In order that the truth may be ascertained I have given a detailed description of this animal, that those who may have an opportunity may judge of its identity by comparison.

I should have referred this species to the genus *Eriphies*, Latr. but the antennæ are not remarkably elongated, nor distant from the ocular peduncles. It cannot be referred to the genus *Atelecyclus*, Leach, as the hands are not crested.

Genus PINNOTHERES.

For characters see p. 67.

SPECIES.

1. *P. maculatum**. Body with very short desiduous, dense hair; clypeus obtusely angulated, indented above the tip.

Inhabits the muricated Pinna of our coast.

Cabinet of the Academy.

Male. *Body* indurated, above black, beneath yellowish white; *thorax* with very short, desiduous, dense hair, a dorsal whitish vitta, which is contracted in the middle and near the base, cruciate before and abbreviated near the clypeus, a large triangular whitish spot each side before the middle, and an obsolete whitish abbreviated line each side behind; *clypeus* and *anterior part of the thorax* margined with whitish; *pectus* and *abdomen* with black insisures, the latter gradually straitened to the tip, which is rounded; *feet*, third and fourth pairs with the second joints of the tibia ciliated on the posterior outer submargin.

Female. Body somewhat indurated, obscure brownish, immaculate, hair shorter, more desiduous and dense than that of the male; *thorax* orbicular, minutely punctured beneath the hair, a double dorsal series of irregular indentations, of which the hind ones are more conspicuous and sometimes confluent into an arcuated line; *feet*, second pair ciliate on the inner part of the penultimate joint, third and fourth pairs not ciliated; *abdomen* ciliated at the edge, and obtusely carinated on the middle, tip entire, very obtusely rounded.

Length, male, seven twentieths of an inch; female rather more than two fifths of an inch.

A common inmate of this species of *Pinna*. In one shell I found the two sexes, and in another two females, but this plurality rarely occurs.

2. P. *Byssomiæ*. (Female.) *Thorax* somewhat transversely oval; *clypeus* hardly advanced, rounded, entire; hand not gibbous near the base of the thumb.

Inhabits the Byssomia distorta.

Cabinet of the Academy.

Thorax glabrous, rounded each side, immarginate; *eyes* sanguineous; *anterior feet* with the hand linear, or not gibbous near the base of the thumb above, ciliated on the inferior edge, fingers two thirds the length of the hand, armed with minute teeth; thumb with a prominent, acute tooth near the base, closing between two much shorter distant ones of the finger; *carpus* with an abbreviated ciliate line within, third joint ciliate on the inner edge; *second pair of feet* ciliate beneath the penultimate joint; *tarsi* unarmed.

Length about one-fourth of an inch.

I found a single female of this species in an anomalous Byssomia, which in a MSS. account of the shells of North America I have named *B. distorta*. It imbeds itself in the large *Alcyonium* of the southern coast, and between individuals of a species of aggregating *Ascidia*.

It is infested by two very distinct kinds of parasites, which I regret not having had an opportunity to examine satisfactorily. One resembled *Fascicola* with the ocellate points of *Planaria*. I have named it *Fascicola nigra*. Body cylindrical, blackish, two ocellate spots near the anterior extremity. It was active, motion undulatory. The other was numerous, attached in two fascicles to the exterior of the thorax, and resembled a minute species of *Amphitrite*.

3. P. *cylindricum**. Body transversely-subcylindrical; anterior feet didactyle, equal; second and third pairs nearly equal, and with punctured tarsi; fourth pair very robust, larger and longer than the anterior ones; posterior pair very small; eyes approximated, orbits ovate orbicular.

Inhabits coast of Georgia.

Cabinet of the Academy.

Body indurated; *thorax* punctured, above depressed, a transverse, abbreviated, indented line behind the middle, and with an elevated line between the origin of the two hind feet, from which the thorax is defracted behind, sides decurved to a rounded tip; *anterior feet*, third joint with a transverse, indented, obsolete line before the tip; *carpus* unarmed; *hand* moderate, elongate quadrate, fingers arcuated, meeting at tip and forming a suboval interval, finger with a larger tooth near the tip, thumb with one behind the middle; *second and third pair of feet* with the penultimate joints pectinated beneath, tarsi with three pectinate lines, third joint of the latter pair granulate above and beneath; *fourth pair*, very robust, third joint larger than the hand, with a double line of granules above, confluent near the tip, and a profound concavity behind, which is granulated on the inferior edge, second joint of the tibia with a double prominent obtusely pectinated line beneath; *posterior feet* very small, simple, hardly attaining the tip of the third joint of the preceding pair, and not equal to the distance between their bases; *tarsi* short, conic; *abdomen* of the *female*, suborbicular, covering the pectus, much narrowed at base, attaining the bifid tip of the pedipalpi, and with a double impressed line in the middle, of the *male* linear, tip rounded and slightly narrower than the base.

Length of the male, three-tenths, breadth, thirteen twentieths; length of the female, seven-twentieths, breadth, three fourths.

Found by Mr. William Maclure, on Jeykill island,

Georgia, and subsequently an individual of the other sex by myself near the same place.

The pedipalpi are precisely the same as in *Pinnotheres*, but this animal seems to be estranged from the genus by several minor characters, as those drawn from the robust fourth pair of feet, the indurated consistence of the body, the transverse thorax, &c. In the two latter respects somewhat resembling the following species. From its magnitude, the firmness of its integuments, and the similarity of the sexes, it seems probable that it is not parasitic. Under these considerations I considered it the type of a distinct genus, and had associated with it the following species; but I prefer in this place uniting them under the genus *Pinnotheres*.

4. *P. monodactylum**. (Male.) Thorax transverse; hands monodactyle.

Inhabits the American coast.

Richmond Museum.

Thorax transversely subeliptical, narrowing each side to the middle of the lateral edge, which is rounded, a tubercle each side marking the situation of the anterior lateral angles, surface punctured; *orbits* suborbicular; *antennæ*, exteriores subequal to the breadth of the clypeus; *hand* oblong, somewhat quadrate; *palm* concave and ciliated in the middle, a spiniform angle instead of a finger, with a tooth at its base, and another at the base of the thumb larger; *thumb* abruptly incurved at base, rectilinear towards the tip, with an angle at the interior middle, tip acute, attaining the tip of the spiniform angle; *feet*, second, fifth and third pairs subequal, the latter rather larger, fourth pair larger, and with the fifth pair

with somewhat dilated tibia; *abdomen* with a few larger punctures, terminal joint rounded at tip, entire, ciliated and attaining the tip of the geminate joints of the pedipalpi.

Length three tenths, breadth one half an inch.

This curious animal occurs in the Richmond Museum. Mr. J. Warrell, the proprietor of that interesting establishment, supposes it to be American, but whether from our eastern or western coast he could not say. It is particularly remarkable in having monodactyle hands, a character which in a very rigid arrangement would not only separate it from the genus *Pinnotheres*, but also from the preceding species as a distinct genus. The tibia of the fourth and fifth pairs of feet are somewhat dilated, but the corresponding tarsi are accidentally wanting in this specimen.

Genus LEPTOPODIA. Leach.

Rostrum elongated, entire; eyes not retractile, distant; pedipalpi, second joint of the peduncle, half as long as the first; palpi hirsute, first and second joints subequal, third longest; feet, anteriores didactyle; tarsi elongated; *abdomen* six-jointed.

SPECIES.

*L. calcarata**. Third joint of the feet three-spined at tip, the middle one large, prominent, and obtuse.

Inhabits coast of South-Carolina.

Cabinet of the Academy.

Thorax unequal, with distant, somewhat acute tubercles, an indented transverse line before the middle, re-

gion of the eyes equal; *ocular peduncles* slightly projected before the eyes in an obtuse spine; *antennæ* shorter than the rostrum, a small spine at their exterior base; *feet*, anterior pair acutely spinous above and beneath, third joints of the remaining feet three-spined at tip, of which the superior one is very robust, elevated, obtuse, and half as long as the first joint of the tibia; *abdomen* obtusely carinated in the male.

Length one half, breadth one fourth of an inch.

I obtained but a single specimen of this remarkable species (a male) in the bay of Charleston on a Gorgonia. It is sufficiently distinguished from the other species of the genus by the very remarkable spine at the tip of the third joint of the feet.

Genus PORCELLANA.

Thorax orbiculate-subquadrate; antennæ, interiores with an elongated peduncle, exteriores elongated, setaceous; external pedipalpi with the inner first joint dilated within; feet ten, anterior pair didactyle, dilated, fifth pair spurious; tail bilamellate each side.

SPECIES.

*P. soriata**. Carpus and hand tuberculate before, tubercles very obtuse, each composed of from four to nine granules; anterior part of the thorax deeply crenate, crenæ inflected, in the two lateral ones are placed the eyes and antennæ.

Inhabits the southern coast.

Cabinet of the Academy.

Thorax naked, edges granulated, an anterior trans-

verse line of about four very obtuse tubercles; *clypeus* with an impressed line, edge three-toothed, of which the anterior one is more acute, the lateral ones forming the inner supercanthus of the eyes; *feet* hairy, third joint unarmed, first joint of the tibia grooved above and with the second granulated; *anterior feet*, third joint slightly granulate at tip and on the anterior edge, the anterior condyle rather prominent; *carpus* destitute of hair, nearly as large as the hand, with numerous granular tubercles on the upper side, anterior edge with a prominent tooth sub-equal to the condyle of the preceding joint and granulated; *hands* hirsute on the inferior edge, elevated into an emarginate and granulated angle above, anterior side compressed and with granulated tubercles, which are somewhat arranged in lines longitudinally, and with the carpus beneath convex, smooth, and white; *fingers* granulated before, granules of the thumb arranged in about three lines, teeth small, regular, resembling the granules, and like them diminishing in size to the tip.

Length of the thorax one-fifth of an inch.

A number of specimens occurred, cast ashore on the beach of St. Catharine's island, Georgia, in an alcyonium.

NOTES.

HEPATUS fasciatus, Latr., is not uncommon on the coasts of Georgia and Florida. It varies considerably in the arrangement and configuration of its spots. When young it is generally more or less fasciate with reddish, but in the adult specimen, these bands are interrupted into large spots, which are each diluted on the disk, and are

somewhat symmetrically disposed. In a specimen brought from Guadeloupe by Mr. L'Hermenier, the spots are minutely divided, punctiform, and equally distributed; the abbreviated granular lines so conspicuous in the young specimen, become almost obsolete in the adult state; the colour of the spots or bands varies from a purplish to a deep sanguineous.

As this species agrees very well with the description of *Cancer epheliticus* of the *Amœnitates Academicæ*, vol. vi, p. 414, I have no doubt of its being the same. The figure which *Rumphius* has given, tab. 8, fig. 5, and which is referred to by the author of the above mentioned description, bears a general resemblance to the *fasciatus*. *Cancer floridus* of Linné, said to be an inhabitant of India, but which is described as a native of North America, in the *Encyclop. Methodique*, is probably also the same, as the description of that lost species agrees very well with our specimens of *fasciatus*.

PORCELLANA galathina. We found many specimens on the coast of Georgia and Florida.

LEUCOSIA punctata, is very common on the southern coasts.

MAJA spini-cincta, Lam., a specimen was taken in Delaware bay several years ago, and is now in Peale's Museum.

Description of a new genus of Fresh Water Bivalve Shells. By Thomas Say.

Genus ALASMIDONTA.

Shell transverse, equivalve; inequilateral, hinge with a primary tooth in each valve; cicatrices three.

Animal resembling that of *Unio*?

SPECIES.

A. Marginata. Shell transversely oblong-suboval, white, covered with an olive brown epidermis, obsoletely radiate with green, numerous concentric wrinkles; *umbo* with about three concentric undulations; *ligament slope* abruptly depressed, with numerous, obtuse, oblique rugæ, decussating the concentric ones, which are obsolete in that part; *within* bluish-white, margin white; cavity of the umbo, not distinctly impressed by the external undulations; *tooth* compressed, oblique, nearly parallel with the posterior slope, and terminating abruptly behind.

Length, exclusive of the umbo, one inch and a quarter, breadth two inches and a half.

Cabinet of the Academy.

The inner margin is of a chalky whiteness, in this respect resembling *Anadonta marginata*. It was communicated to me by Mr. Isaac Lea, who found it in the Scioto river.

Unio undulata of the first and second American editions of Nicholson's Encyclopedia, is a species of this genus, but it is very distinct from the *marginata*.

This genus will be properly placed between *Unio* and *Anodonta*, and in conjunction with *Dipsas* of Leach,

it will complete the chain of connection between those two genera. *Alasmidonta* corresponds with those genera in the number of its cicatrices, but is separable from *Anodonta* by its primary tooth; from *Unio* by being destitute of the lamelliform teeth; and from *Dipsas* also by the last mentioned character, as well as by the presence of a primary tooth, which is wanting in that genus.

This new genus I formerly proposed when describing the above mentioned *Unio undulata*, under the name of *Monodontia*; but as this term has been applied to a genus of Univalves, I have substituted that of *Alasmidonta*.

Description of two new Species of Linnæan Lacerta.
By Jacob Gilliams.

Genus SALAMANDRA.

S. variolata. Plate 18. fig. 1. *Body* black, with a slight violaceous tinge, and irregular white spots, which are more numerous on the sides, and wanting on the venter and inferior portion of the tail, but are present beneath the lower maxilla; every part of the surface covered with numerous, approximate, pale dots. *Eyes* somewhat prominent. *Teeth* minute, numerous. *Tail* very slightly compressed, gradually and regularly attenuated, acute. *Posterior feet* five-toed, the inner toe hardly prominent; *anterior feet* four-toed, the inner one small.

Total length three inches and four fifths; from the tip of the head to the origin of the hind feet, one inch and

1160





four fifths; from the hind feet to the tip of the tail, two inches; from the anterior feet to the tip of the head, thirteen twentieths of an inch; between the feet, one inch and three twentieths.

Inhabits the southern states.

Cabinet of the Academy.

This species occurs not unfrequently, in small streams of water. I have not seen it so far north as Maryland.

I am indebted for these specimens to the Florida Party.

Genus SCINCUS.

S. erythrocephalus. Plate 18. fig. 2. *Body* reddish brown tinged with cupreous, beneath whitish; *head* red above, whitish beneath, wider at the base than the neck, and rapidly attenuated to the nose, which is obtuse, maxillary angles prominent each side, giving to the head a triangular appearance; inferior orbits of the eyes with from twenty-five to thirty small granuliform scales; ears large; no bands, lines, or spots.

Length from the nose to the anterior origin of the hind feet, four inches; from the ears to the tip of the nose, one inch and one tenth.

Inhabits Maryland.

Cabinet of the Academy.

This scink is well known to the inhabitants of the southern states, but is unknown as an inhabitant of Pennsylvania. It is supposed to be venomous, and many tales are told of the effects of the venom of its bite.

It is generally known by the inappropriate name of "red headed scorpion."

The colour of the head, its width at the junction with the neck, and the stature of the whole animal, suffi-

ciently distinguish this species from all hitherto described, unless we are to suppose that the remarkable and striking characters of the head have been overlooked, which seems very improbable.

The general proportions of the body are very similar to those of the *Scincus 5-lineata*, though it is proper to observe, that the tail of the only specimen I have seen had been accidentally broken off within a short distance of its origin.

I am indebted to Mr. James Keech of Maryland, for this specimen.

Fig. 2. a. is an enlarged view of the eye, to exhibit the granuliform scales.



An Account of the Minerals at present known to exist in the vicinity of Philadelphia. By Isaac Lea.

METALS.

Blue Carbonate of Copper. Cuivre carbonaté bleu. H.

This mineral occurs in minute crystals, and in very small quantities, of a beautiful dark blue colour, at the mines on Perkiomen creek, about twenty-two miles north of the city. It is found in veins, with lead and zinc, in the old red sandstone formation.

*Green Carbonate of Copper. Cuivre carbonaté vert. H.
Malachite. W.*

Occurs both radiated and botryoidal of an emerald green colour. Locality and geognosy same as the last species.

Red Oxide of Copper. Cuivre oxidulé. H. Ruby Copper. W.

Beautiful capillary crystals, translucent and of a bright red colour, have been lately discovered by Messrs. J. Lukens and B. Say, at the same place with the two former specimens.

Copper Pyrites. Cuivre pyriteaux. H. Yellow Copper. Aiken.

It occurs in amorphous masses, of a brass yellow colour and often externally iridescent, at Perkiomen, and on Chester creek, near a saw mill, three miles west of Chester, in Delaware county. At the latter place it exists in quartz, accompanied with sulphuret of molybdena.

Magnetic Sulphuret of Iron. Fer sulphurè ferrifere. H.

This mineral occurs amorphous, in the hornblende rocks near the engine at Morris hill, and in small quantities.

Magnetic Oxide of Iron. Fer oxidulé. H. Magnetic Iron Ore. W.

We find this on the Schuylkill in small quantities, of a dark iron black, and possessing a slight metallic appearance. It is strongly attracted by the magnet. A variety, known by the name of octaedral iron, should be mentioned here. It is crystallized in regular octaedrons from one sixteenth to one half of an inch in diameter. Some of these crystals divided parallel to either face, and transposed or partly turned round, form macles of triangular formed tables, with their three sides bevelled, each

end being replaced with two faces inclined towards each other. It occurs in large quantities in the talc rocks of Chestnuthill, immediately on the Wichicon creek, eastern side, ten miles from the city.

Sulphuret of Iron. Iron Pyrites. W. Fer sulphurè. H.

In our hornblende rocks we find this mineral, generally disseminated, but sometimes in the form of cubes. It occurs also, at the mine near Chester, and at Perkiomen lead mines, crystallized in various forms, and frequently tarnished so as to present the appearance of other metals.

*Brown Oxide of Iron. Hematite. W. Fer oxidé
Hematite. H.*

This species of iron ore is found at Upper Dublin, about fifteen miles north of the city. It frequently occurs in geodes, the interior sides of which are perfectly black, and of a botryoidal, mammillary or coralloidal form: sometimes the cavity contains sand. Its construction proves it to be concretion. Some specimens have also been found on the Schuylkill.

*Scaly red Oxide of Iron. Red Iron Froth. W. Fer
oligiste luisant. H.*

At the lead mines on the Perkiomen we find fine specimens of this mineral. It occurs there in scaly particles of a nearly cherry red colour; soft to the touch, and soils. It is taken out of the vein with the lead, generally incrusting some other mineral.

Foliated Iron Ore.

The iron ore known by this name here, frequently occurs in quartz rocks, seldom thicker than the eighth of an inch, and appears to be a black oxide of iron. It is found at Chestnuthill and on the Wichicon.

Jaspery Iron Ore.

It occurs massive, in considerable quantities, in the road near Springmills. Its fracture is flat conchoidal, and colour brownish.

Argillaceous Iron Ore.

This species occurs in large quantities near Burlington. Its colour is yellowish brown, and earthy, being entirely loose. It is valued here highly as an ore, and carried to the lower part of the state, where other ores are plenty.

Bog Iron Ore.

This species of ore is found abundantly in New-jersey, where it is wrought in considerable quantities.

Hydrat of Iron. Blue Iron Earth. W. Fer Phosphate. H.

This mineral occurs crystallized and massive, and in considerable quantities, near Imleytown, N.J. The crystals are translucent, and have a laminated and radiated appearance. Colour, dark blue. Before the blowpipe it becomes brownish, prior to its being heated to redness, but boils up when perfectly so, the bead presenting a metallic appearance, and is slightly magnetic. With

borax it forms a yellowish brown glass. It is frequently attached to organic remains. The massive or earthy variety, is said to occur in pieces of thirty pounds weight at Allentown, N. J. When first exposed to the atmosphere, it presents a white appearance, but soon changes to a fine sky blue. It is affected by the blowpipe as the crystallized. Professor Cooper has lately proved this to be a hydrat, and not a phosphat of iron. Its solutions in nitric acid, do not precipitate the solutions of lead.

Arsenical Iron. *Arsenical Pyrites.* W. *Marcasite.* K.
Fer arsenical. H.

A piece of this mineral of nearly two pounds weight, was given me by a person on Perkiomen, who informed me it was found in the neighbourhood. Colour, yellowish white, fracture uneven. When subjected to the blowpipe, the arsenic was volatilized in a white vapour, giving out a strong alliaceous odour.

Chromate of Iron. *Fer chromaté.* H.

This combination of chromic acid with iron, is found in the talc rocks of Chestnuthill, where it is generally accompanied with small fibres of asbestos. Colour, rather darker than steel gray. Some of the more impure varieties give a singular appearance to the rocks there. They present dark spots from one quarter to three or four inches, disseminated throughout. It is also found in a very pure state in steatite rock, on Lewis's farm, near the Westchester road, about ten miles from the city, and near the Lancaster turnpike, about the same distance. From the two last localites it is used in the arts here.

*Sulphuret of Lead. Galena. Aiken. Lead Glance. W.
Plomb sulphuré. H.*

A considerable quantity of this species of lead ore has lately been taken up, by Mr. Wetherill, at the mines on Perkiomen. It occurs generally cubic, sometimes steel grained. A few specimens were found by Messrs. J. Lukens and B. Say, presenting a cube with the solid angles truncated, forming a triangular facet. It occurs here with barytes, quartz, phosphate, carbonate and molybdate of lead, and red iron froth. This vein is in the old red sandstone formation, and direction nearly north east and south west, forming a line with the mines near Newhope, Brunswick, and Schuyler's copper mine.

Carbonate of Lead. White Lead Ore. W. Plomb carbonaté. H.

This mineral is frequently found accompanying the last mentioned one, at the same place, generally crystallized in various forms, and presenting beautiful specimens. It is transparent, and more resinous than quartz.

A substance which I believe to be the black carbonate of lead is also found at this mine.

Sulphate of Lead. Natural Lead Vitriol. W. Plomb sulphaté. H.

Lately this variety of lead has been found by Mr. Lukens, at Perkiomen, but not in any considerable quantities, and generally connected with quartz, or some of the salts of lead. It much resembles the carbonate in translucency, but is distinguishable by its insolubility in nitric acid.

*Molybdate of Lead. Yellow Lead Ore. W. Plomb
Molybdaté. H.*

This beautiful salt of lead is found, though rarely, at Perkiomen. It occurs in small yellow waxy crystals, generally in the interstices of quartz, or connected with the other lead ores. It was first discovered by Mr. Z. Collins.

*Phosphate of Lead. Brown and green Lead Ore. W.
Plomb Phosphaté. H.*

Locality same as the other salts of lead, where it occurs in beautiful pale green coloured crystals, and incrustations.

Sulphuret of Zinc. Blende. W. Zinc sulphuré. H.

This mineral occurs in considerable quantities, at the mines on Perkiomen creek, of the yellow, brown, and black varieties, generally massive, but sometimes crystallized. Its fracture has a strong resinite aspect. It is associated with barytes, and the vein is nearly six inches in thickness.

*Sulphuret of Molybdena. Molybdena. W. Molybdena
sulphuré. H.*

On Chester creek, three miles from the town of Chester, and about seventeen south of the city, this metal occurs in considerable quantities, in granite. The specimens from this place, exhibit the usual characters of molybdena, being of a light lead grey, and bright metallic lustre. Its structure is lamellar, and it marks, with much softness, upon paper. It is said to occur here crys-

tallized, but I have never witnessed it. Sulphuret of iron and phosphat of lime accompany it.

Red Oxide of Titanium. Rutile. W. Titane oxydé. H.

In the granular limestone of London grove, Chester county, particularly on the property of Mr. John Jackson, this mineral occurs crystallized in prisms, geniculated, in angular and broken pieces, and rolled. Colour, generally that of blood red to brown.

Silico calcareous Oxide of Titanium. Rutilite. W.

Titane siliceo calcaire. H.

Mr. Vanuxem and myself, about eighteen months since, discovered this species, imbedded in the hornblende rocks of the quarry at the end of the canal road. Some specimens are finely crystallized in very low octahedrons, nearly an inch over, with the obtuse angles truncated. Colour, a dull waxy yellow. Mr. S. Conrad had some years previous, observed it in small quantities, at the falls of Schuylkill.

EARTHY MINERALS.

Zircon. Zirkon. W. Zircon. H.

This mineral exists in several places of our neighbourhood. It was first discovered at the falls of the Delaware at Trenton, about twenty yards above the eastern abutment of the bridge, in gneiss, by Mr. S. Conrad. Crystals, generally small four-sided prisms, of a dark brownish red, imbedded in pale blue quartz, and greenish feldspar. Another locality of this mineral was discovered by Mr. Vanuxem and myself, about two years

since, on the Brandywine, eastern side, about two miles beyond Westchester, on the opposite side of the creek from James Jefferis's farm. It is there found in pieces of blue quartz in the road. Mr. Lukens has also found it lately, about fifteen miles on the York road. Within a few weeks, Mr. A. E. Jessup has found it to occur on the Schuylkill, about ten miles from the city, in a rock similar to that of Trenton.

Pistazite. Epidote. H.

Pistazite, both massive and crystallized, was found by Mr. Vanuxem and myself, in a large piece of quartz, about one fourth of a mile above the upper bridge on the Schuylkill, western side, and nearly one hundred yards from the river. It did not appear to be exactly in place, as it was found on a pile of other stones. Colour, yellowish olive. Form hexaedral prism with diedral summits.

Zoizite. Epidote. H.

Zoizite occurs in the hornblende rocks of the quarry, end of canal road, in acicular crystals and fasiculated, sometimes associated with zeolite, and rutilite. Colour, grayish, and has a slight pearly lustre.

Melanite.

Mr. C. Wister is mentioned by Cleveland as having found this mineral, imbedded in gneiss, back of Germantown, six miles from the city. Form, a double dodecaedron with trapezoidal faces. Colour, velvet black. I do not believe this to be the melanite of European mineralogists, but a fine specimen of the common trapezoi-

dal garnet. Werner says, melanite occurs in the *newest flætz trap formation.*

Garnet. Grenat. H.

Some beautiful specimens of the variety of garnet called pyrope, occur at Mr. Wilcox's paper mill, about one mile from Concord, Chester county. Colour, a fine dark red, and when polished makes a fine stone of luxury.

Common Garnet.

Very large quantities of this variety, occur in the primitive formation of our vicinity, more particularly so in the mica slate on the Schuylkill.

The best specimens, of the dodecaedron with rhomboidal faces, are found on the Wichicon creek, about nine miles from the city. The prismatic garnet is also found near the same place.

The dodecaedron, truncated on all its edges, occurs on the eastern side of the same creek, on the top of a hill, about half a mile above its confluence with the Schuylkill. A very fine large specimen, now in possession of Mr. S. Morton, measuring about five inches in diameter, was found in digging a well at Barrenhill meeting house, twelve miles from the city.

The trapezoidal garnet, with twenty-four faces, occurs remarkably perfect, of a very deep red colour, in the mica shist, about one and a half miles above the falls of Schuylkill, where the lock is now forming. Some of those taken to Paris by Mr. Vanuxem, are highly prized by Haüy, as beautifully illustrating the theory of decrements.

Manganesian Garnet. Grenat Manganésie. Brogt.

This mineral has lately been discovered by Mr. Jessup, one fourth of a mile west of the Ridge Road, and about nine miles from the city. Colour, brownish red. It has only been discovered massive.

Staurotide. Staurolith. W. Staurotide. H.

On the Wichicon, about eight miles from the city, a large, steep, and uncultivated hill, formed by almost perpendicular gneiss rocks on its eastern side, contains a large quantity of this mineral, in single crystals of a dark reddish brown colour, and resinite appearance. Form a hexagonal prism, terminated by diedral summits. It is associated here with dodecaedral garnets and small quantities of cyanite. It was first observed here by Mr. Godon.

Beryl. Edler Beril. W.

This mineral is found on Mr. C. Peale's farm, near Germantown. Colour, yellowish green. I have lately found some specimens of it, in a quarry of gneiss belonging to judge Peters, about three hundred yards above the upper bridge, on the west side of Schuylkill. Colour of one part, yellowish, of another, green, and puts on more the appearance of emerald.

Tourmalin. Schörl. W. Tourmalin. H.

In most of the granite and gneiss rocks of our neighbourhood, we find tourmalin, generally crystallized in long prisms, singly and in bunches, sometimes, but rarely, terminated with three or more faces, and always black. More particularly we find it, at judge Peters' quarry, and Sheridan's quarry, near the upper bridge, as

well as on the opposite side of the Schuylkill. The finest specimens have been found eight miles on Westchester road.

The brown tourmalin, has been found at London grove in carbonate of lime.

Quartz. Berg Kristal. W.

This mineral exists in large quantities, and in different forms around us.

Amethyst quartz, of a beautiful violet blue, and gradation to a light blossom colour, is found occasionally in Chester and Delaware counties.

Blue quartz, amorphous, is found on the Brandywine, two miles west of Westchester, and contains zircon.

Smoky quartz, is found finely crystallized, on the Brandywine, in Chester county.

Limpid quartz, occurs in large quantities, crystallized, generally aggregated, showing only their pyramids, at Perkiomen and Norristown.

Quartz arenaceous, we have in large quantities on the shores of our rivers, and in the sand and gravel hills west of the city.

Hornstone. Hornstein. W. Quartz agathe grossier. H.

This mineral occurs in the gravel hills near the Schuylkill, in small pieces and of a fine texture. On the Easton road, about ten miles and a half from the city, it occurs in large quantities, in place, of a grayish white colour, massive and of a dull splintery fracture. On the road to Springmills, about two hundred yards beyond Barrenhill meeting house, immediately at the cross roads, is found a rock much resembling coarse hornstone.

Where it has been exposed to the atmosphere, it separates generally into four-sided prisms, with two acute and two obtuse angles, of an inch or two in diameter and five or six long, the ends are broken at right angles with the prism.

Flint. Quartz agathe pyromaque. H. Fuerstein. W.

We find this mineral only in rolled pieces in this vicinity. It exists in the gravel hills near the Schuylkill, and is also found on the shores of the Delaware, of a black colour, containing the remains of a small zoophyte of a globose appearance. Found near the Delaware above Bristol, enclosing *terebratula*.

Chalcedony. Quartz agathe chatoyant. H. Kalzedon. W.

Many beautiful specimens of chalcedony, were found by Mr. Vanuxem and myself, on the Westchester road, between the sixteenth and seventeenth milestones. It is associated with quartz in decomposed serpentine. Colour, bluish milky white, covered with rich, yellow, drusy, quartz crystals. It sometimes contains arborizations, of a hair brown colour, supposed to be *confervæ*. Mr. Conrad has also found it between Springfield and Concord.

Basanite. Lydian Stone. W.

This variety of silecious slate, is found in rolled pieces at the falls of the Delaware at Trenton, of a dark bluish black colour. It evidently has been brought by the water, from the grawacke and transition limestone formation, in the neighbourhood of Easton, about fifty miles above.

Argillite. Argile schisteuse tabulaire. H.

Clay slate occurs on the Norristown road, about sixteen miles from the city, of a bluish gray colour. It does not appear to be sufficiently perfect there, to be made use of.

Zeolite. Zeolith. W. Stilbite. H.

In the hornblende quarry, at the end of the canal road, about four miles from the city, this mineral occurs radiated and incrusting the rocks, of a white colour. It is also found there in crystals, though not very perfect.

Jasper. Quartz Jaspe rouge. H.

Jasper of various colours and fine texture, is found in angular and broken pieces, on the shores of the Delaware and Schuylkill, some of which have chalcedonic veins through them. It occurs in place of a rough yellow colour, about one mile on this side of Springmills, immediately in the road, in considerable blocks, and contains a small portion of chalcedony and drusy quartz.

Feldspar. Feldspath. H. W.

The granite and gneiss rocks of our neighbourhood are, in a great measure, composed of this mineral. A few fine specimens, well crystallized, were found by Mr. Vanuxem and myself, at judge Peters's quarry, about one quarter of a mile above the upper bridge, in ten-sided prisms, with diedral summits, and one specimen hemitrope. About a mile up the canal road, on the eastern side, is found a beautiful white variety, associated with crystallized mica and phosphate of lime.

Adularia.

This variety of Feldspar, occurs in the hornblende rocks, of the quarry, end of canal road. Some specimens are distinctly crystallized.

Desintegrated Feldspar. Kaolin.

Feldspar in a state of decomposition exists on the canal road, and on Mill creek, near the Baltimore turnpike, and in large quantities about three miles west of Chester, near the creek.

Clay.

Nature has abundantly supplied us with this substance, so useful to the manufacturers of porcelain. The numerous kilns for the burning of bricks, sufficiently point out the situation where it is most plentiful. A more pure variety of clay, is found on the Delaware below Bordentown, and thence to Newcastle. Large quantities are taken in waggons to Pittsburg, a distance of more than three hundred miles, used by glass blowers, for making pots. Variegated clay is also found near Bordentown.

Mica. Glimmer. W.

This occurs exceedingly abundant in the primitive formation of our neighbourhood. We find it in hexagonal prisms and tabulated, on the Schuylkill, near Germantown, and on the Wilmington road near the Woodlands, where I have found hexagonal crystals of black mica, circumscribed by those of a light brown, forming curious specimens. The largest plates I have seen, of this vicinity, were found by Mr. Vanuxem and myself about

fifty yards east of the canal road, just beyond the house of Mr. Caspar Morris. The plates are six inches over; and the hexagonal form of crystallization is beautifully illustrated by the arrangement of lines, of a dark metallic colouring matter, either iron or manganese. Green mica is found at Chesnuthill, near the Wiccon, where it is probably coloured by chrome; also near Chester. Mica very largely enters into the composition of our granite, gneiss, and mica slate rocks.

Chlorite. Talc Chlorite. H. Chlorit. W.

Chlorite of a dark green colour, and in fine particles, is found with quartz at Willowgrove; and laminated, near the soapstone quarry on the east side of Schuylkill. Dr. Seybert says, near the Warwick iron works in Chester county, and in Montgomery county near the Schuylkill, but I regard the latter rather as a talc rock.

Hornblende. Gemeiner Hornblend. W. Amphibole. H.

Large masses of hornblende rock exist on the Schuylkill, about two hundred yards above the engine house; and about two miles again above that. It is pretty well crystallized, in a bladed and acicular form, on the canal road.

Lithomarge. Steinmark. W. Argile Lithomarge. H.

Cleaveland says, that this mineral occurs in Montgomery county, b does not particularize the spot.

Steatite. Speckstein. W. Talc Steatite. H.

Steatite is found in considerable quantities, about ten miles up the Schuylkill, where, with the connection o

talc, it forms the soapstone rock, which is much used in the city.

Serpentine. Gemeiner Serpentine. W. Roche Serpentineuse. H.

Near Westchester this mineral occurs very abundantly, and is used for common building stone. Colour, from light to dark green. It also occurs in Montgomery county.

Talc. Gemeiner Talc. W. Talc hexagonal et laminaire. H.

Talc forms a considerable portion of the rocks known by the name of soapstone, on the Schuylkill, about ten miles. It does not occur here crystallized, but laminated and compact, of a greenish gray colour. Some specimens from this quarry, are of a rich green colour, semitransparent, and generally connected with bitter spar, or the magnesian rhomboidal carbonate of lime.

Asbestus. As Beste. H. Asbest. W.

Fibrous asbestos is found in the serpentine rocks about one mile north of Westchester, and in many other places in Chester and Montgomery counties. It occurs also in very delicate fibres on quartz crystallized, in the hornblende quarry, end of canal road.

Mountain Cork. Bergkork. W. As Beste tressé. H.

It occurs at London grove, on the property of John Jackson, in granular white limestone. It is white, and when the pieces are considerably thicker than paper, spongy.

Cyanite, Kyanit. W. Disthène. H. Sappare. Sau.

This very beautiful and interesting mineral, occurs crystallized in the gneiss rocks on Springfield road, about two hundred yards from Darby bridge. Colour varies from a very light to a dark Prussian blue. It is generally darkest in a longitudinal line along the middle of the crystal, which is for the most part an elongated table. At the eleventh mile stone on the Wilmington road, it is found more abundant, but less pure; crystals generally detached and almost black. On the road to the Lazaretto it occurs blue; also about eight miles up the Schuylkill. On the Wichicon, about four miles from its mouth, associated with staurolite and garnets, in micaceous schistus; but in small quantities. It was first observed by Mr. S. Elliot in this vicinity.

Actynolite. Variety of Amphibole. H. Strahlstein. W.

On the Wichicon, about ten miles from the city, opposite a to large mill, half a mile below the bridge, actynolite is found in acicular crystals, of a green colour, imbedded in soapstone rock. Mr. Conrad found it in large masses at Concord, Chester county.

Tremolite. Tremolith.; W. Variety of Amphibole. H.

I have seen this but in one place in the neighbourhood of this city, viz. at London grove. It here exists in considerable quantities, in the limestone quarries of Mr. John Jackson, both bladed and fibrous, of a beautiful white. In some instances the fibres are so minute, as to render it almost compact.

Carbonate of Lime. Chaux Carbonatée. H. Kalkstein. W.

The limestone of our vicinity does not present much variety. It exists in distinct rhombic crystals at London grove, and in White's soapstone quarry with talc, affording fine specimens. Granular limestone occurs in large quantities, about twelve miles on the Reading road, beautifully white, and is much used for the embellishment of the buildings of the city. This variety exists also at London grove, and on the western side of Schuylkill about twelve miles, of a fine black, and clouded. Compact limestone occurs in very large quantities, from a north to a south west direction, at the distance often to twenty miles.

Marl. Argile calcarifere. H. Mergel. W.

In Newjersey we have two varieties of marl.

Indurated gray marl, with small shining specks, occurs at Croswick's, near Bordentown, and contains organic remains.

Earthy marl occurs in many places, and in great quantities, in different parts of Newjersey, more particularly at Woodbury and at Haddonfield, ten miles from the city. At Burlington, Allentown, and Emleytown, various organic remains are found imbedded in it.

Phosphate of Lime. Spargelstein. W. Chaux phospatée. H.

The crystallized variety of this mineral, is found in most of the granite rocks about us, particularly on the canal road and near Hamiltonville.

The massive variety was found by Mr. Vanuxem and myself, on the Baltimore turnpike, one mile from the bridge.

Fluate of Lime. *Chaux fluatée.* H. *Fluor Spar.* W.

Mr. Vanuxem proved a mineral to be fluate of lime, which was given him by Mr. Hagner, about two years since, from the quarry of gneiss at the falls of Schuylkill. Colour violet blue. No determinate crystallization.

Sulphate of Barytes. *Baryte.* W. *Baryte sulphatée.* H.

This mineral is found in considerable quantities at the lead mines at Perkiomen, both compact, and crystallized in a crested form, of a white colour, sometimes tarnished by iron either yellow or black, forming fine specimens. It is associated with lead, quartz and iron. About three miles west of Newhope, it occurs in considerable quantities, compact and crystallized, in the old red sandstone formation, with a small quantity of copper.

COMBUSTIBLES.

Amber. *Succin.* H.

Amber has been found in small quantities at Crosswicks creek, about one mile from Bordentown; and on the Delaware, at Whitehill; in both places with pyrites and carbonised wood. Cleveland says, it also occurs near Woodbury, in large plates in a bed of marl; and at Camden, opposite the city, where a large peice had been found in a stratum of gravel.

Bituminous Wood.

This substance is sometimes found in the marl of New Jersey. Some specimens have been brought from Woodbury, black, and of a perfectly ligneous texture. It burns rapidly, and gives out a strong, disagreeable smell. It occurs also at Croswicks creek.

I beg leave to add, that there are several minerals found lately in this vicinity, the characters of which are not sufficiently determined to be admitted into this paper.

Description of three new Species of the Genus Næsa.

By Thomas Say.

[The following portion of the *Account of the Crustacea of the United States*, was mislaid, so that it could not appear in its proper place; it ought to have succeeded the genus *Sphœroma*, in the paper alluded to.]

Genus NÆSA. Leach.

Tail, ultimate segment largest, furnished on each side with a simple, pedunculated, subrectilinear, appendice; *antennæ* subequal, from twelve to twenty-jointed, superiores with an ample biarticulated peduncle, the basal joint larger; space between the antennæ obvious, but not ample, base not concealed by the clypeus; *nails* bifid.

SPECIES.

1. *N. caudata**. Ultimate segment of the tail, tuber-

culated and with a profound sinus at tip; first caudal segment conspicuous.

Inhabits Eggharbour.

Cabinet of the Academy.

Body oblong-oval, semicylindrical, a little attenuated before, segments equal, first one longer, nearly equal to the head; first segment of the *tail* equal to those of the body, with three distant tubercles above, *terminal segment* as long as the four preceding ones conjunctly, depressed near the tip, and marked by a deep sinus, within which are two or four small teeth, and above its base a larger vertical one, base of the segment with three distant tubercles, the lateral ones double; lateral processes spiniform, a little incurved, surpassing the tip of the segment; *eyes* longitudinally oval, convex, prominent; *anterior* feet simple, resembling the others; colour fuscous.

Length rather more than one fourth of an inch.

: Found on the sea beach, in small pools of water left by the recess of the tide.

2. *N. depressa**. *Body* broad, depressed, linear; *first caudal segment* concealed, *second* attenuated; *anterior feet* monodactyle.

Inhabits Eggharbour.

Cabinet of the Academy.

Body broad, depressed, punctured, sides parallel; *segments* subequal, anterior ones rather shorter; *first segment of the tail* not visible, *second* equal, as long as the three preceding visible ones, attenuated to an obtuse point, which is carinated above and attained by the lateral, spiniform, acute processes, beneath concave, effuse at tip, *eyes* apparently lunated, but really rounded, with

listant granules, and touching the anterior segment of the body; *hands of the anterior feet* dilated, ovate, *thumb* as long as the palm, nearly attaining the carpus; tip closing within a prominent, spinose tooth, on the base of the palm; *hands of the second pair* cylindric, incurved, with a process dentate at tip, and placed at the inner base, armed with an equal incurved thumb not closing on the hand, obtuse, and furnished with a seta at tip; remaining feet ciliated.

Length half an inch, breadth rather more than one fifth of an inch.

Found with the preceding species, common.

3. *N. ovalis**. *Body* oval, depressed; ultimate segment of the tail obtuse, with three hardly raised very obtuse lines at base; lateral appendices dilated, three caudal segments

Inhabits bays and inlets of the United States; common.

Cabinet of the Academy.

Body perfectly oval, segments subequal, fourth, fifth, and sixth largest, first segment of the tail equal to the preceding one, simple; *terminal segment* triangular, obtusely rounded at tip, rectilinear each side, half as long as the body, with three longitudinal, abbreviated, raised, very obtuse lines at base, of which the middle one is most conspicuous; *lateral processes* dilated, depressed, rectilinear within and rounded on the external margin, so as to form with the terminal segment a perfectly semi-orbicular termination of the body, without interval; *head* somewhat unequal; *eyes* conspicuous, hemispherical; *antennæ* equal; *labrum* triangular, advanced, very con-

spicuous, terminating the head before and forming with the base of the superior antennæ behind it, a rounded termination without interval, completing the oval form of the body; *feet* all armed with bifid nails, none of which close on the preceding joint.

Length less than three twentieths of an inch.

This little animal is extremely common in sea water, usually creeping on fuci and other marine plants; we found it as far south as St. John's river in Florida.

REMARKS BY THE PUBLISHING COMMITTEE.

In concluding the present volume, the publishing committee consider it a duty which they owe to the readers of the Journal and to themselves, to state, that when the paper of Mr. Rafinesque was admitted into the preceding pages, they were not informed that a portion of it had already appeared in a contemporary journal, otherwise, agreeably to the plan upon which the work has been conducted, that paper, or at least the exceptionable portion of it, would have been rejected; this procedure would have been indispensable for the interest of science, as one of the species described, had been previously published, by Mr. Rafinesque, under a different specific name, and no direct reference is given by which its identity might be detected; it is therefore proper to state, that *Exoglossum Lesurianum* of this Journal is

absolutely synonymous with *Exoglossum vittatum* of professor Siliman's journal.

It is necessary further to observe, that the society explicitly disavows any responsibility for the contents of the papers which are published, such responsibility resting entirely with the authors.

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the same day, having been given leave to do so by the Bishop's order
and the King's command. And so he quitted the city, and went
over land and water to the town of Lucca, where he remained
till about noon, when he came to the city of Florence.

He was received with great courtesy by the Duke of Florence,
with whom he had a conference respecting his proposed enter-
prise, and was shown every thing necessary for his success.

He then took his leave of the Duke, and went to the town of Pisa,
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REFERENCE TO THE PLATES OF VOL. I.

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ERRATA.

ge iii, Contents, line 7 from bottom, for *in* read *on*.

11, line 5, for *It is to captain Lewis*, read *It is captain Lewis*.

24, 18, place the semicolon after *medicine*.

63, 4 from the bottom, for *Ceraphon* read *Ceraphron*.

57, 10, 11, for *body silvery above and spotted with red*, read *eyes two, black, oblong*

5, 5 from the bottom, for *ceratophthalma* read *ceratophthalma*.

9, 13, for *fissirostra* read *fissirostra*.

4, 3, 4, for *anal fins shorter than the dorsal*, read *anal fin shorter than the second dorsal fin*.

10, for *Branchia* read *Mem. bran.*

22, for *amber* read *umber*.

35, 1, for *state Connecticut*, read *state of Connecticut*.

bottom line, for *ventral*, read *ventral fins*; and for *extends*, read *extend*.

34, dele the *of*.

35, 11, for *abdominal fin*, read *abdominal fins*.

10, 5, for *manuscripts o*, read *manuscripts of*.

11, 15, for *and Limosella* read *and another of Limosella*.

31, bottom line, for *atennæ* read *antennæ*.

33, 19, for *Pyruly* read *Pyrula*.

36, 10 and 14, for *bands* read *hands*.

71, 10, for *the species* read *this species*.

01, Chapter VI. line 3, for *miuntes* read *minutes*; and for *meetings* read *meeting*.

23, the plate facing this page is plate X.

25, the plate facing this page is plate XI.

75, 20, for *assists* read *assist*.

80, 8, for *lanmlliform* read *lamelliform*.

94, first note, for *Bodianus* read *Bodianus*.

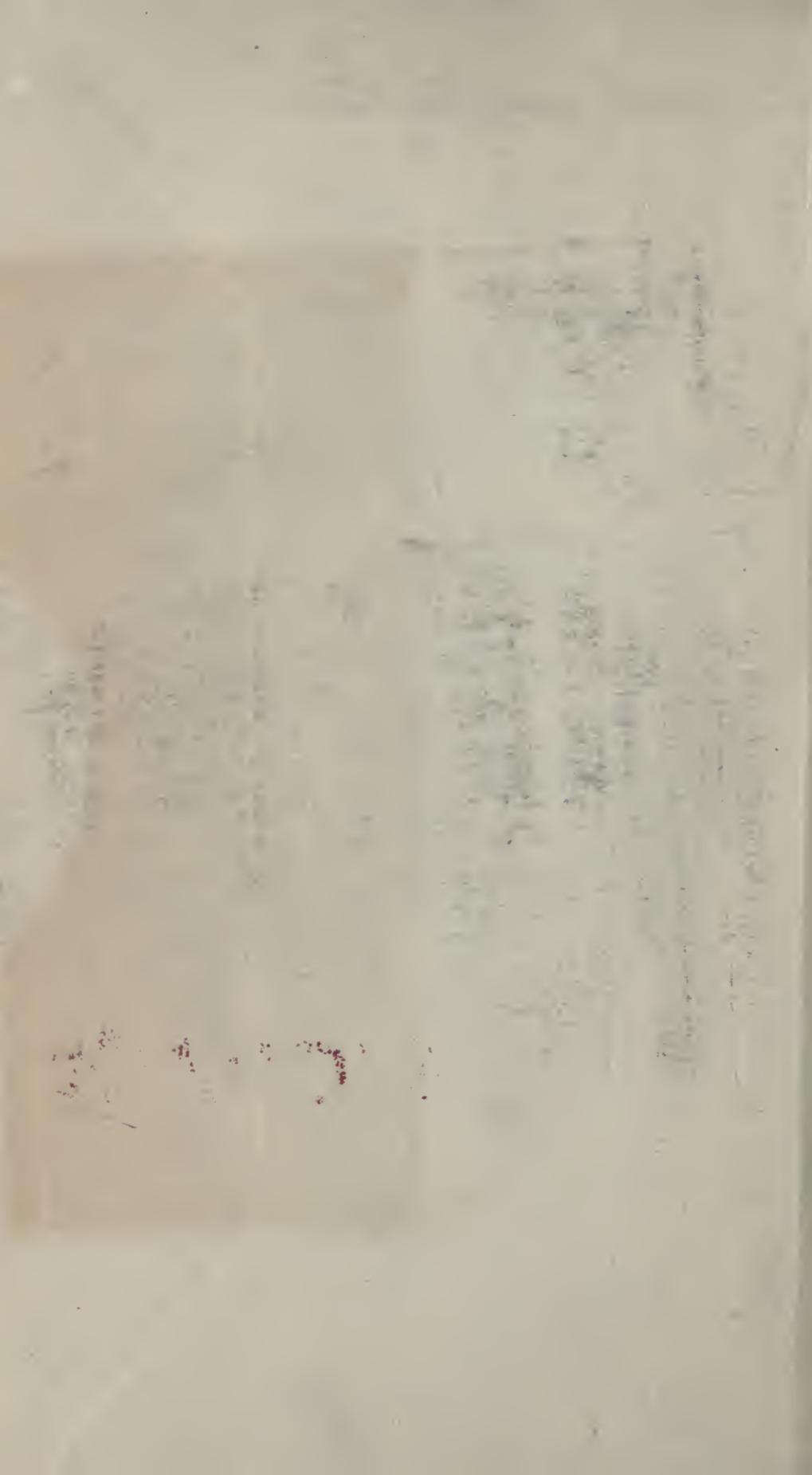
96, 3 from the bottom, for *its to* read *to its*.

33, 4 from the bottom, for *Lam.* read *Latr.*

5 from the bottom, for *Latr* read *Lam*.

136, 10, for *agrees* read *agree*.

52, 20 and 21, for *Fascicola* read *Fasciola*.



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